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VINES AND VINE CULTURE

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VINES AND VINE CULTURE.

BY

ARCHIBALD F. BARRON,

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SECRETARY TO THE FRUIT COMMITTEE;
AUTHOR OF "BRITISH APPLES, PEARS, &c."

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PREFACE TO THE FIRST EDITION.

So long ago as the year 1873 we were induced to commence a series of short papers on VINES AND VINE CULTURE for the pages of *The Florist and Pomologist*. Although appearing at distant and irregular intervals, these papers have, in the course of time, extended to some length; and inasmuch as they embrace certain matters pertaining to Grape-growing that had not before been introduced into any work specially devoted to the Vine, they have met with a considerable amount of notice and approval.

Thus encouraged, and having been repeatedly urged to have the whole re-published in such a form as to make it a comprehensive Guide or Text Book on Vine culture—primarily for the use of amateurs and young gardeners—we have at length consented to do so, in the hope that, despite its many imperfections and omissions, it may be the means of affording some useful aid to those who are interested in the growth of Grapes.

VINES AND VINE CULTURE, as it is now submitted to the public, much exceeds in extent and variety the papers originally published in *The Florist and Pomologist*, many new chapters having been added, together with numerous plates and other illustrations. The portraits of the varieties of Grapes have been photographed from Nature directly on to the wood block by Mr. A E. Smith, and engraved with much skill by Mr. Worthington G. Smith.

The Vine has not hitherto been without its records, for many treatises, from the pens of the most experienced cultivators of the day, have from time to time appeared. These are entitled to the very greatest respect, as being records of successful practice in the management of the Vine, and the production of its fruit. Indeed, scarcely any gardening subject has been more ably or more copiously dealt with. It has been our endeavour to go a little beyond our predecessors in the same walk, and to treat of Vines and Grapes in all their various phases and characters; in a word, to provide a work on Vines that may at times prove useful to the skilled practitioner, as well as to the inexperienced amateur or the student.

In our official capacity as Superintendent of the Royal Horticultural Society's Garden establishments, we have enjoyed special facilities for becoming acquainted with, and ascertaining the characters and

peculiarities of, the different varieties of Grapes in cultivation, many hundreds of sorts having come under our personal care and observation. With the exception of six of the American kinds which, although under cultivation, have not yet fruited, the descriptions given of the several varieties are all derived from our own observations, verified in some cases by the excellent descriptions given in *The Fruit Manual*, the author of which we have to thank for many lessons pomological.

For the examples of Grapes figured, and which have been selected as fair average samples, we are indebted to many kind friends, to whom we now tender our warmest acknowledgments; without their help in so kindly supplying us with typical examples of their splendid cultures, our task would have been much more difficult.

The present treatise being based on the papers published and illustrated in *The Florist and Pomologist*, our thanks are especially due to the Editor of that excellent periodical for the care which has been so ungrudgingly expended on their original publication. It is, moreover, our pleasing duty to record our indebtedness to the Editors of *The Gardeners' Chronicle* and *The Garden*, for the use of various illustrations that would otherwise have been difficult to obtain. We have also specially to thank Mr. Harrison Weir, Mr. James Boyd, Mr. Jones of the Royal Gardens, Mr. T. F. Rivers, Mr. Woodbridge of Syon House, Mr. Roberts of Gunnersbury, Mr. W. Thomson, and others, for valuable information which they have supplied, and for so readily replying to the numerous enquiries addressed to them.

To Mr. Thomas Moore, our thanks are due in an especial degree, and are here gratefully tendered, for much valuable advice and assistance which have been rendered by him while the revised work has been passing through the press, and which have more than compensated for our own inexperience in these matters.

With these feelings of gratefulness for help freely given, we now offer to the Horticultural world the results of our experience amongst Grapes, in the hope that in this way we may be making ourselves useful in our day and generation, and lending a willing hand to help forward the development of practical Horticulture.

A. F. B.

Royal Horticultural Society's Gardens,
Chiswick, February, 1883.

PREFACE TO THE SECOND EDITION.

It is a little more than four years since we ventured to offer to the gardening world, in a completed form, our experiences amongst Vines and Grapes. The reception accorded to Vines and Vine Culture from all parts of the world where Vines are cultivated has been of the most gratifying character. We feel greatly honoured by the many expressions of approval we have received, and hereby take this opportunity of tendering our respectful thanks to all our kind friends, patrons, and critics. That we may have been enabled to impart some useful information, and to help in the extended and improved cultivation of this prince of exotic fruits is to us a high reward.

In presenting a second edition we have to state that we have been enabled, by the use of a somewhat smaller type, and printing the various plates of Grapes with the text, to greatly reduce the cost, whilst at the same time adding considerably to the matter by the introduction of several new and important subjects not hitherto included. Some little defects pointed out to us by our kind friends have been corrected and improved, our aim and endeavour being to make our work a trustworthy and useful guide to all those interested in the cultivation of the Grape Vine.

Since the first edition appeared, our dear friend, Thomas Moore, who so ably assisted us in its production, has been called away. Our thanks are now specially due to Mr. R. D. Blackmore, of Teddington, and to Herr Horvath, of Funfkirchen, Hungary, for the kindly interest they have taken in our doings, and the interesting and valuable information so freely supplied. We have also to tender our best thanks to Mr. J. Webber and Mr. Monro, Covent Garden Market, for important information in regard to marketing Grapes, to which special attention is directed, as also to Mr. Wright, 171, Fleet Street, Mr. Kay, Finchley, Mr. Bashford, Jersey, and Mr. Smith, Caledonia Nursery, Guernsey, for their kind aid and assistance. Whatever merit Vines and Vine Culture may possess, is due in a great measure to those who have so freely and so ably assisted us in our undertaking.

A. F. B.

October, 1887.

PREFACE TO THE THIRD EDITION.

AGAIN we are called upon for our VINES AND VINE CULTURE, and have to thank the gardening community for the continued highly gratifying reception accorded to our work. We have endeavoured to bring the present edition up to date by the introduction of several new illustrations; and fresh matter connected with the subject of Commercial Grape Culture or the growing of Grapes for sale, which has developed to such an extent during the past few years as to become one of the most important industries in the land.

A. F. B.

Chiswick, May, 1892.

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VINES

AND

VINE-CULTURE.

CHAPTER I.

HISTORICAL SKETCH.

THE Grape Vine—*Vitis vinifera*—grows wild in the temperate regions of Western Asia, Northern Africa, and Southern Europe. It is generally believed to be indigenous to Armenia, to the south of the Caucasus, where it grows with great luxuriance, clinging to tall trees, and producing fruit in great abundance and variety.

Fig. 1. is an illustration of the common Vine, run wild, as it is found in France, where it grows in hedges or on the borders of woods, from pips disseminated by birds, etc. It is there called Embrunche, Lambrunche, or Lambruche, from the Latin *Labrusca*—a wild Vine. The bunches are generally small, and the berries sour and with little flesh; and vary considerably in shape and colour, retaining, to some extent, the characteristics of the particular variety of which it may be an accidental seedling.

The cultivation of the Grape Vine has, from the earliest time, attracted the attention of man. In nearly every portion of the Holy Scriptures, from the record of the Flood to that of the Crucifixion of the Saviour, the Vine is mentioned. In the Book of Genesis we are informed that "Noah began to be an Husbandman, and he planted a Vineyard;" and in the Book of Numbers we read that "The men whom Moses had sent to spy the Land of Canaan returned with a bunch of Grapes, which they bare between two upon a staff." Solomon had a Vineyard that let for a thousand pieces of silver. In the Psalms of David, the Vine, evidently from its well-known character, is often referred to in a symbolical sense:—"Thy wife shall be as the fruitful Vine upon the walls of thine house." "Thou hast brought a Vine out of Egypt, thou hast cast out the heathen and planted it."

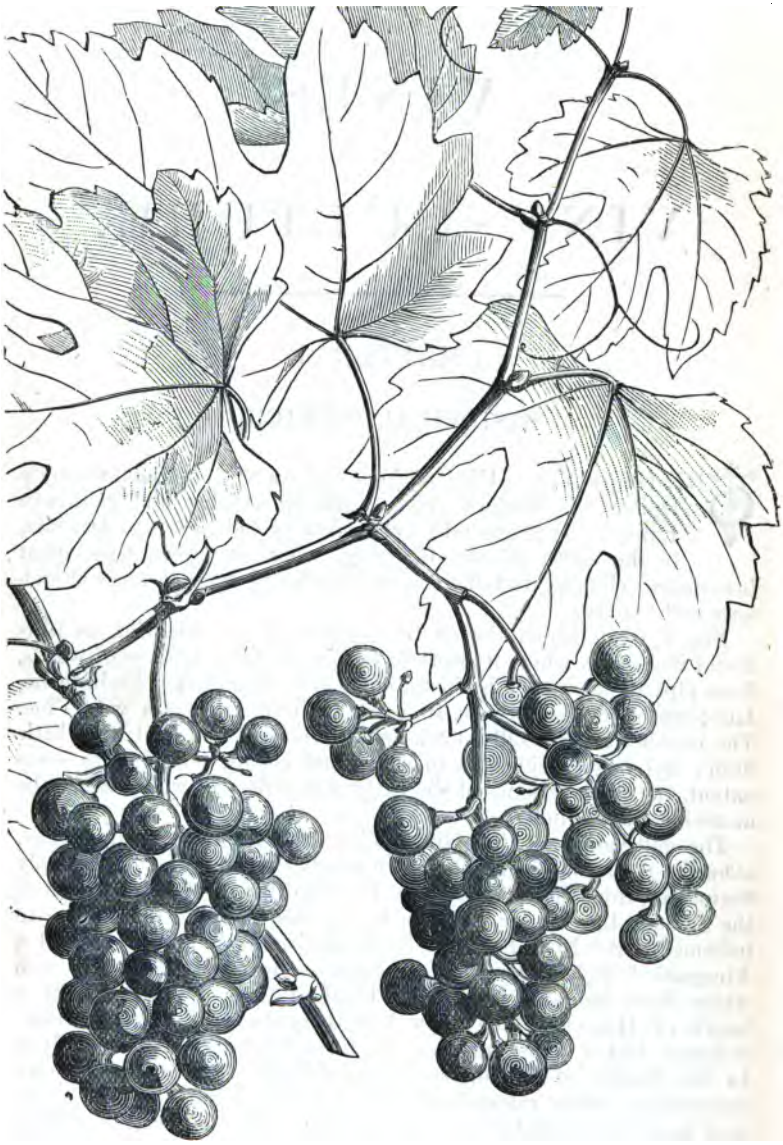

Fig. 1. THE WILD VINE—VITIS VINIFERA.
NATURAL SIZE.

Records of the cultivation of the Vine and of the making of wine in Egypt are found in the writings on the ancient tombs, which go back some five or six thousand years. The fact that Vines succeed best where the roots are enabled to draw abundance of moisture seems to have been well understood in olden times; thus we read in Ezekiel (xix., 10):—"Thy mother is like a Vine in thy blood, planted by the waters; she was fruitful and full of branches by reason of many waters."

The heathens likewise held the Vine in high estimation, more especially, it would appear, for the wine that was made from it. Bacchus was elevated to the rank of a god, for having taught men the use of the Vine. He is often represented as an old man, crowned with a Vine, to teach us, as some writers have put it, "that wine taken immoderately will make us childish like old men." Wine was used by the ancient Romans in the worship of their gods. Plato says nothing more excellent or valuable was ever granted by God to man.

In various old books we read almost fabulous accounts of the great size to which the Grape Vine grew in olden times in Eastern countries. Pliny says that Vines were ranked as trees, and speaks of one that in his time was six hundred years old. Theophrastus speaks of a Vine so large, that a statue of Jupiter, and the columns of Juno's Temple were made of it. Strabo says that the Vines of Margiana and other places were so great that it required two men to compass them with their arms; and he speaks of bunches of Grapes a yard in length. At the Duke of Montmorency's house, at Ecoan, there is a large table, which, it is stated, is made of the wood of the Vine; and the doors of the Cathedral of Ravenna are made of Vine Tree planks. It is also stated that on the coast of Barbary there are some very large old Vines growing.

The Eastern Grapes are described as being large and wonderful. At Damascus the bunches are mentioned as weighing upwards of twenty-five pounds; and at Sidonijah, near Damascus, some of the Grapes are stated to be as large as pigeons' eggs. In the Islands of the Archipelago, the bunches are stated to be from ten to forty pounds weight each, while in Persia the Grapes are described as being so large that a single berry is a good mouthful. How far credence may be given to these statements as to the great size of the Vines themselves, and that of the berries — statements which seem almost incredible—we have no means of determining. It is, however, alike remarkable and satisfactory to note that the size and weight ascribed to the bunches have been approached if not equalled by the cultivators of the present day. Grapes would appear to have been at one time extensively grown in Syria, but their cultivation there has been for ages neglected. This may be owing to the spread in those regions of the Mahommedan religion, which forbids the use of wine, although it permits the eating of the Grapes. It is to

the Romans that we are indebted for the introduction of the Grape. We are told that in Italy, about A.D. 85, the planting of Vineyards had so much increased that agriculture was thereby neglected, and Domitian issued an edict prohibiting the planting of any new Vineyards, and also ordered one-half of those existing to be cut down. The Romans trained their Vines to trees, such as the Poplar and Elm: hence these trees were said to be "married to the Vines." Thus in Ovid's *Vertumnus and Pomona*:—

> "If that fair Elm, he cried, alone should stand,
> No Grapes would glow with gold to tempt the hand;
> Or, if that Vine without her Elm should grow,
> 'Twould creep a poor neglected shrub below."

Thus, also, Shakespeare in the *Comedy of Errors*—

> "Thou art an Elm, my husband, I a Vine,
> Whose weakness, married to thy stronger state,
> Makes me with thy strength to communicate."

Pliny states that the Vines in Italy would out-top the highest trees. On this account the Grape-gatherers used to insert a clause in their agreements to the effect that if they should fall and were killed, their masters should be at the expense of burying them.

It is uncertain at what period the Vine was introduced into England. Some writers think it must have been in the reign of the Emperor Augustus, about A.D. 10, as at that time the Romans had possession of a great part of this country, and largely introduced the luxuries of Italy. Others think that it was not introduced until about A.D. 280, during the reign of the Emperor Probus. It is, however, certain that Vineyards existed in this country at a very early period of our history. They are mentioned in the "Domesday Book," and also by Bede, who wrote in A.D. 731. The Isle of Ely was called the Isle of Vines by the Normans, the Bishop of Ely, shortly after the Conquest, receiving as tithes wine made from the Vines grown in his diocese. In the reign of Henry III. we read of Vineyards. Malmesbury mentions the county of Gloucester as being, in his time, very rich in Vineyards: and there still remain traces of that at Tortworth. The first Earl of Salisbury planted a Vineyard at Hatfield, which is noted as being in existence when Charles I. was taken there as a prisoner. There are records of Vineyards existing in various parts of Surrey, and a notable one, which is still partly in existence, once flourished at Bury St. Edmunds. Vineyards seem to have been common to all monastic establishments, but the suppression of these, and subsequently the fact of cheap foreign wines becoming more easily accessible, led, no doubt, to neglect in their cultivation.

About the year 1560, Grapes seem to have become rather scarce, as we read of Grindell, Bishop of London, sending Queen Elizabeth a present of Grapes every year from Fulham; Grapes being esteemed of great value, and a fruit Queen Elizabeth "stood well affected to."

These must have been cultivated in the open air, as hot-houses were little used, if at all, in England, even at the beginning of the last century; while talc, not glass, or what was termed "Muscovy glass," was the lighting medium used in their construction.

Speechly mentions a Vine that was growing in the open air at Northallerton, in Yorkshire, in 1789, that had covered a space of one hundred and thirty-two square yards, and was supposed to have been planted one hundred and fifty years. During the last century, the cultivation of Grapes seems to have become pretty general; several notable examples being still in existence — as that of the Black Hamburgh Vine at Valentine's, Ilford, in Essex—which Gilpin, in his *Forest Scenery*, says was planted in 1758. This was stated to be the oldest Vine in England, and to be the parent of the still more celebrated Vine at Hampton Court, which was planted in 1769, and now covers a space of about two hundred and twenty square yards. Of more modern Vines, the most remarkable examples are those at Cumberland Lodge, Windsor, which annually produces about two thousand pounds weight of Grapes; the great Vine at Hampton Court, and that at Sillwood Park, Sunninghill.

The cultivation of Grapes in the open air in this country is not now practised to any extent, the introduction of cheap glass, orchard houses, ground vineries, etc., leading to far more satisfactory results. At Castle Coch, Cardiff, the Marquis of Bute has established a Vineyard on a somewhat extensive scale, as an experiment. *See* chap. xxi. In congenial seasons, in the southern and warmer parts of England, fairly good Grapes may undoubtedly be grown on walls in the open air, and it does seems a pity that more attention is not bestowed on this branch of their cultivation.

In regard to the number of varieties existing in olden times, very little information is to be obtained. Pliny says that in his time they had a "multiplicity of Vines, both thick-skinned and thin-skinned." In Europe, at the present time, the number of varieties is beyond computation. In one catalogue of 1881 alone, that of M. André Leroy, of Angers, four hundred and seventeen names are given. Every country—every district almost—has varieties peculiar to itself, adapted to the several climates, as well as to the purposes required; thus there are the Hungarian and Italian Grapes, few of which are known in this country; the French Grapes, and the Spanish Grapes, etc., not to speak of the American Grapes, which belong to another species. Grapes are now also largely cultivated in various parts of Australia, the South African Colonies, and many other countries.

In this country, Grapes being almost exclusively grown for dessert purposes, the number of varieties in general cultivation is comparatively limited. Until a very few years ago these were all of foreign introduction, but of late years many English seedlings have been added. Miller, in 1768, describes eighteen sorts; Speechly, in 1791, records

fifty sorts; Forsyth, in 1810, fifty-three sorts; Thompson, in the *Horticultural Society's Fruit Catalogue*, in 1831, records one hundred and eighty-two names; and, finally, Hogg, in the *Fruit Manual*, published in 1884, describes one hundred and forty-three varieties very carefully, this last being, in fact, the only authentic list ever published.

To Mr. Thomas Rivers is due the credit of introducing many new varieties of Grapes; and the same may be said in reference to the Royal Horticultural Society, which, in its garden at Chiswick, has been the means of having many hundreds of varieties tested, mostly under our own observation.

In no country in the world are Grapes grown with so much care, and brought to such perfection, as in Great Britain. Grapes of the highest quality are now becoming common in every household; and fresh Grapes may be obtained at all seasons of the year—spring, summer, autumn, and winter. During the past twenty-five years, the cultivation of Grapes has increased to an extraordinary extent; forming a special object of commercial enterprise. *See* chap. xxii., *Commercial Grape Culture.*

CHAPTER II.

PROPAGATION OF THE GRAPE VINE.

THE Vine is a plant of most simple and easy propagation, roots being very freely and readily produced from every portion of the stem, if only it be placed under favourable conditions. Let the natural or proper roots of a Vine become disorganised, and immediately the whole stem, if in a humid atmosphere, will become clothed with roots, which hang from it like a long beard. These are generally called air roots, or adventitious roots, but would, if allowed, fix themselves in the soil and become ordinary roots.

Thus nature gives us the first lesson in the art of propagating the Vine. We are by this means, at least, shown that roots are very readily produced from the old or ripened wood. But never under any circumstances do we see roots being produced from the young or growing wood; and although by great skill and care a few plants might be so propagated, the number would be very limited.

Various methods of propagation by means of the ripened wood are, or may be adopted, namely, by Layers, by Cuttings, and by Eyes; also by Budding, Inarching, and Grafting.

1. *Layers.*—This is the most primitive method of all, and might, indeed, be termed the natural method. It is a rough and ready mode of increase, so far, at least, as regards the Vine, and is only resorted to by those who have but slender means at their command. To layer, we have simply to take a branch or shoot of the fully ripened wood, and place it so that the part at which it is wished to have the roots emitted may rest on the soil, and fasten it firmly into this position. It is not necessary to cut the stem in any way, as roots will be emitted very freely without this if the soil be kept moist. When it is found that roots have been produced, the layered portion may be partly or wholly severed from the parent plant. The Vine stems may, of course, be layered either into pots or into the soil of the borders as may be required. Pots with soil in them may also be suspended for the more convenient placing of the shoots for layering. A not uncommon practice is to lead the shoots through the bottom of the pot, which is then filled with soil, into which the Vine readily takes root, and when rooted is dissevered. Very strong Vines are thus obtained by means of layering. Again, damp moss or any other similar material may be tied round the stem, and roots will be readily produced from the parts thus covered, so that plants may in this manner be obtained.

Fig. 2.
VINE CUTTING.

2. *Cuttings.*—This term is applied to Vine shoots having several buds or eyes, as shown in fig. 2. This mode of increase is that generally adopted in the Vine-yards of all the great Vine-growing countries, where Vines are required by thousands: but it is rarely made use of for raising them in this country. We, however, adopt much the same method in the propagation of our Currants and Gooseberries. The cuttings are selected and cut into lengths of from eight to twelve inches, leaving usually attached a small piece of the two-year-old wood — a "heel," as it is termed. The French term such cuttings *boutures par crossette.* The *Vignerons* are, however, not very particular as to the quantity of this old wood which is left, or, indeed, whether there is any left, and it is quite immaterial. The lower eyes or buds should be cut out, leaving only two or three at the top of the cutting. In the Vineyards these cuttings are planted in the ground at once, in small trenches, and treated as permanent plants. It is a method which has not been, and never will be, much practised in this country.

3. *Eyes.*—By this term is meant the single buds of the ripened wood of the previous season's growth. This is the mode of propagating the Vine almost universally adopted throughout this country, and it is by far the best; it is, however, only available for practice under glass, so that it is suited to our necessities, and could not be followed were we obliged to have recourse to open-air propagation. Fig. 3 shows the eye as prepared for planting. There is no art or skill required in the preparation. The rule is to select always the most perfect eyes from the best ripened wood of Vines that have been matured early; such buds will be found to start much more freely than those from later ripened wood. It is the hard well-matured wood, with firm plump eyes, that must be looked for, where a stock has to be raised, in preference to the thick soft wood, with seemingly forward eyes. It is well, therefore, to be somewhat particular in selecting the eyes, so that every one of them may be depended on; this is far better than putting in a great number, and then having to throw half of them away. Having selected the wood, proceed to cut the eyes, as shown in fig. 3, to about one inch or a little more in length, that is to say, about half-an-inch on each side of the eye. Some persons prefer cutting the wood straight across, whilst others favour a slightly

slanting cut; we rather prefer the latter, but it matters very little. Some consider it of great importance to cut a small piece off the wood on the side opposite to the eye, but we have not observed any benefit from so doing. The callus is produced below the bud, and generally first on the upper side, *i.e.*, the same side as the bud; it is seldom formed directly opposite to the eye, except when cut very closely, and never beyond or above the eye. The fact is, the roots are produced independently of the eye, from any portion of the stem having an eye or bud above it, but more freely near to where the cut is made. All that is left above the bud is inert and dies away. There is no advantage, therefore, in leaving any length of wood beyond the bud.

Fig. 3. VINE EYE.

The season for "putting in" the eyes is any time during January or February. The earlier the operation is performed, the earlier, of course, can the young Vines be finished off. Some prefer cutting the eyes in December, and placing them in soil in pans in a cold frame until about February, before they are put into heat; others cut them and place them in heat at once, and that is the plan which we prefer. The beginning of February may, therefore, be taken as a good and safe mid-season for performing the operation. A few days earlier or later are, however, quite immaterial, much more being dependent on the after-management of the plants.

There are many ways of "putting in" the eyes. They may be placed in shallow pans, *i.e.*, a number of eyes in each pan, in properly prepared soil, to be potted off after they have made some roots and have commenced growing; or they may be—and this is, perhaps, the best plan of all—placed singly in small three-inch pots, which should first have some charcoal or broken crocks put at the bottom, and be filled up with a compost of one-half fresh turfy loam, and one-half leaf-mould, not too much decayed, with a good proportion of sand. When the pot is filled, the soil not being pressed down over firmly, make a hole in the soil sufficiently large to hold a walnut, which should be filled with silver-sand; place the eye on this, pressing it down until the top of the bud is just level with the surface of the soil. The pots or pans containing the eyes should then be plunged in a bed having a bottom heat of about 80°, and a top temperature of from 65° to 70°.

Another good method, where a number of eyes have to be propagated, and where there is convenience for adopting it, is to prepare a small portion of the bed itself with suitable soil, and to place the eyes there at once, removing them and potting them off as they become fit. This is an economisation of space in the propagating pit, which, in the spring season, is always much crowded. A most

excellent plunging material is cocoa-nut refuse placed over hot-water tanks. The eyes themselves strike root most readily into this material when it is mixed with a little sand, only the roots formed do not make a sufficiency of fibres, so that they remove badly. The soil should be gently watered after putting in the eyes, and be kept moist, but not at any time allowed to become soddened. When these "eye-cuttings" commence to form a callus, the buds will, at the same time, be bursting into leaf. This is the delicate and critical period, for every part is tender and easily destroyed. It is necessary

Fig. 4. VINE EYE STARTED.

at this stage to be extremely careful as to the watering and the temperature. Once, however, that the top is growing, and the roots started, as in fig. 4, reaching to the side of the small pot, they are comparatively safe; and this, if all circumstances have been favourable, should be in about a fortnight after inserting the eyes. About the

time that the first leaf is fully developed, when the young plants are about two inches high, they should be potted into five-inch pots, and from that time grown on rapidly. See *Pot Culture*, chap. xv.

In Jersey and Guernsey a very simple system of propagation is frequently adopted, the eyes and short-jointed cuttings being "put in" in the open ground in beds, where they are grown for three years, when they are considered ready for planting in their permanent positions. The following plan is also adopted:—About March, some No. 2 pots are selected and filled to within three inches of the rim with good strong soil; on this the Vine eyes are placed, about one inch apart, and covered with fine soil. The pots are then placed in some sheltered situation, and occasionally watered. By September the eyes are well rooted, and the growths from one to two feet long. The following spring these plants are shaken out and planted in light sandy warm soil, where they are allowed to grow till autumn; they are then cut back to three or four eyes, and left till the following spring, when they are carefully lifted and planted in their positions.

4. *Budding.*—The budding of the Vine differs somewhat from the operation which is ordinarily understood by the term "budding" as practised with the Rose, etc. In the case of the Rose, the bud as attached to the bark only is inserted, the whole of the wood being removed; while in the case of the Vine, the wood of the bud is not removed, but left as it is in a graft, so that the operation may more properly be termed *bud-grafting*. Fig. 5 shows a "bud-graft," or an "eye," such as was shown by fig. 3, prepared for affixing to the stock, and represents a bud of the ripened wood of the previous season's growth. The mode of performing the operation is simple, it being only required to make a cut on the stock corresponding to the cut on the prepared bud, so that the *inner* bark of the stock and that of the bud may be brought together. See *Grafting*, p. 12.

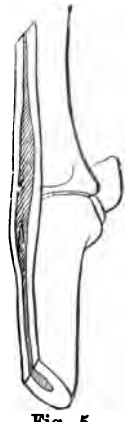

Fig. 5. Bud Graft.

Budding the Vine in the manner here described is not much practised. It is, however, sometimes advantageous, as by its means the bare stems of Vines can be re-clothed—for the buds can be inserted on any part of the stem. We have had recourse to this method when by accident a shoot has got broken off in the operation of tying down; and it is just at this stage, when the Vines are in flower, and the shoots are being tied down, that the operation can be most advantageously performed; but of this more anon.

There is another method of budding Vines, which is frequently practised, and that is with the young half-ripened wood while there is still a sufficient flow of sap going on for the formation of cambium to form the union,

the bud remaining dormant until the following spring. The bud is taken from a Vine-shoot which is in a growing condition, or which has just begun to ripen. The bud is cut from the shoot in the usual manner, with a leaf, as in the case of the Rose, only the wood is not extracted, but is inserted with the bud on to the stock, in the same manner as in the bud-graft shown in fig. 5. The younger the stock on which this method of budding is performed the better. It cannot be advantageously practised on very old stems. It is a good plan for rapidly testing the merits of a new sort, since it permits of a great number of buds being inserted on a Vine already established.

5. *Inarching*, or grafting, *par approche*, as the French very properly term the operation, is a method of attaching two growing plants together, and it is very frequently adopted in the case of Vines. It is found to be a safe and easy process, and there are many ways of doing it. A shoot of a permanent Vine may be inarched on to a Vine in a pot, and a new plant of the permanent Vine be thus obtained; or a plant in a pot may be so placed as to admit of its top being inarched on to a permanent plant, and this is more frequently the requirement. Some cultivators perform the operation whilst the plants are at rest, but this is not a safe period; others inarch about the time when the first leaves are expanded, when the first rush of sap is over, and at this time inarching can be performed with the greatest certainty of success. The operation is subject to the same rules as grafting, and will be explained under that head, the only difference being that the scion is not separated from the parent stock until after the union has taken place.

There is another process of inarching, however, which is very much in favour with many Vine-growers, viz., that of uniting the green or growing shoots of the stock and scion. The union in this case is formed very quickly and very effectively, and the inarched shoot, in the course of a week or so, grows away quite freely, The difficulty in this process is that the stock and scion must necessarily be of an almost equal thickness, and so when it is wished to inarch a young slender growth on to a large-stemmed old Vine, it can only be accomplished by the medium of one of the side-shoots. Some growers like this method so much, that instead of trusting to simple grafting, they first "strike the eye," and grow the plant to a certain size, then inarch it. It is eminently a safe and sure method.

To inarch, then, is simply to bring two growing shoots or stems together, and to unite or fasten them to each other, as in grafting. As soon as the scion has fairly taken hold, sever it from its own root —partially at first, and finally and completely in about a week after, keeping the stock in subjection so as to give prominence to the scion.

6. *Grafting.* — The grafting of the Vine has generally been considered a somewhat difficult operation, and it is actually so. In the scion, as in the stock, part of the tissue or substance of the plant

has ceased to grow, while another part is still in a growing state, or, at least, is capable of growth. The object of the operation is to secure adequate contact of the growing portions of the scion and of the stock respectively. The difficulty of the process lies, not in the operation itself, but chiefly in getting the stock and the scion into fit condition for each other. The Vine is a plant in which, at the commencement of growth, a most extraordinary quantity of water ascends from the root, so much so that if any portion of the stem is cut at that time, a very large outpouring of watery fluid takes place, which gardeners term "bleeding," although there is no real analogy between this flow of water and the efflux of blood in animals. If cut in winter, this "bleeding" does not take place, neither after the Vines have got into full leaf does this flow occur. Some growers recommend grafting before the rise of this watery sap takes place, when the plants are at rest; this is not, however, at all a satisfactory or successful time, and the reason why it is not so is chiefly this: there is a want of moisture in the substance of the stock, to sustain the vitality of the scion and facilitate growth, for in grafting or budding, the tissues must be more or less turgid with moisture, but in this case they are not sufficiently so, and so no union is effected. To graft it as we should an Apple, just when the watery sap begins to flow, would be fatal in the case of the Vine, on account of the great amount of liquid, which would continue to flow for days, and thus prevent the union of the parts. The period which we have found to be the safest and most satisfactory for grafting is just after the first rush of watery sap has passed, when the cells, which constitute the tissues or substance of the plant, are in a growing condition, and before they get dried up. This is also about the time when the first few leaves are fully expanded and the Vines are in flower; but it is dependent greatly on the strength of the plant, as a vigorous plant will have the watery sap continuing to flow in full tide for a much longer time than a weaker one. A very good test for ascertaining the exact period we have found to be this:—With the point of a knife, just prick the bark; if a little moisture exudes, the stock is in condition for the graft; if there is none, it is too late to attempt it; but should it happen that there is a great flow, continuing for some days, do not attempt to graft or to cut the stock any more, until this flow has somewhat subsided. This pricking will not, from the smallness of the incision, cause much harm, but injury would assuredly result were the cut to be enlarged, as would be required in grafting; while from the amount of bleeding and the exudation of the cell-contents the union could not, under such circumstances, take place.

The stock, then, being found in the right condition, it is necessary to have the grafts so likewise—they, of course, should also have been properly cared for. To have the cuttings or scions in proper condition

is a most important point in all propagation, and inattention to this is very frequently the cause of failures amongst the inexperienced. In

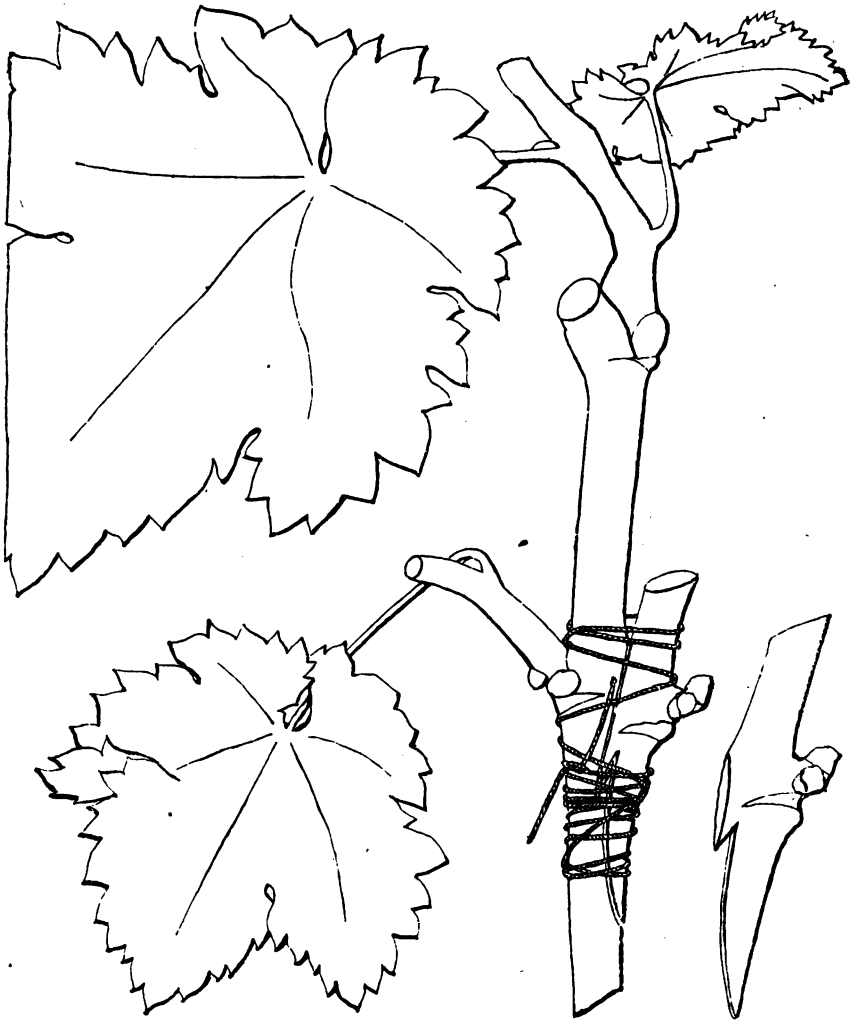

Fig. 6. VINE GRAFT.

the case of Vines which have to be pruned in winter, the grafts should be selected at that time and laid by, in soil behind a north wall, or where they may be shaded from the sun. In a situation like this the

eyes will keep fresh until midsummer, and can be used at any time when required. A day or two before they are likely to be required, they should be examined; if late in spring, and the buds are slightly "on the move," they are in proper condition; if they have not yet commenced swelling, place them in heat, so as to have the buds just a little excited, and in such a state that, when cut through, the scion may appear to be a little moist over the cut surface.

The stock and scion being thus in condition, the operation may be performed in the manner shown by fig. 6. Cut down the stock to any point required, selecting, of course, some suitable part for fitting on the scion—not always easily to be found on old Vine stems. At whatever part of the stock it may be determined to affix the scion, it is necessary to leave a growing shoot and some leaves above this point, for the purpose of drawing off, by evaporation, the superabundant water, and likewise for forming, and, perhaps, drawing up nourishment for the supply of the scion itself until a union is formed. Vines, it may be remarked, have their buds wide apart, and this is frequently overlooked in dealing with them. In a pruned Vine, there is little or no vitality in the bit of stem that may be left beyond a bud; the vitality practically ceases at the bud, so that were a graft to be put on with no bud beyond, it could not grow for want of growing tissue to which it could adhere.

The process of grafting may be performed in various ways, to which it will be unnecessary to allude here. The simplest and best is that represented by our figure—common whip-grafting. It does not matter how large the stem of the Vine may be, for, the graft being prepared, a corresponding portion of the stem is made bare, the requirement being to make as much *inner bark* to fit *inner bark* as possible, so that the growing parts of the scion may be in the closest approximation to the corresponding parts of the stock. The scion being affixed should be tied on tightly with matting and covered up with some mastic or grafting wax. Mastic l'Homme Lefort is the best material we have ever used, requiring no preparation. Clay and moss are objectionable, for this reason, that as there is so much moisture in the house, the graft, instead of forming an organic union, emits roots into the clay, etc., instead of uniting with the stock. In about ten or twelve days after grafting, if the operation has been successful, the bud will have grown somewhat. The shoots left on the stock beyond the graft should now be checked and kept in subjection to the graft; and in about a month's time the matting and wax may be removed and the shoot treated as established.

Vines grafted in this manner on strong stocks will grow twenty to thirty feet the first season, and produce the strongest possible wood; and Vines of any size or of any age, if in a healthy condition, may be so operated upon. It is a capital plan of introducing a new variety into an established house.

Another very excellent and certain mode of grafting Vines is that which is termed *Bottle Grafting*. It is thus described by Mr. Wright in *The Journal of Horticulture*, xxiv., 77 (1873):—"Select a stout, short-jointed, well-matured lateral shoot for a scion, with bold buds. Take a slice off the graft near the middle, say five inches long, leaving four inches below it for inserting into a bottle, and three inches above (with a bud) to grow and form the future Vine. Take a similar slice off the stock, fit the two together, and bandage round with tape. The slicing should be done quickly, cleanly, and fearlessly, not merely removing the bark, but shaving pretty well into the wood. After tying, no moss or clay or any other covering being required, suspend an ordinary wine bottle fixed securely, with the end of the graft inside, and keep this filled with rain-water, placing a little charcoal in the water to keep it pure. When the grafts have grown six feet—not before, remove the bottles and the ligatures, and the operation is completed. This mode of grafting is performed about the same time as the other —after the Vines have commenced to grow. If carefully executed, few failures will occur, and if the Vines are strong, canes or rods, from eighteen to twenty feet in length, will be produced the same season, healthy Vines bearing a full crop of fruit at the same time."

CHAPTER III.

HYBRIDISING AND RAISING VINES FROM SEEDS.

VINES are so easily propagated from cuttings, etc., as already explained, that the raising of them from seeds is not often had recourse to, except for the purpose of obtaining new varieties. The varieties of Grapes usually reproduce themselves from seed, that is to say, if the seed of a certain variety be sown, that same variety will most likely be raised from it. They only vary to a limited extent, unless they are artificially impregnated. A seedling Vine may perchance have a little more vigour in its constitution, and so for a time produce larger fruit, and, consequently, be considered a distinct variety; hence, many Grapes have been sent out as distinct, but which ultimately have proved to be nothing but the old sorts. Unless great care has been taken to properly cross-fertilise the flowers, the chances are a hundred to one that nothing new will be obtained.

The flower of the Grape Vine is so constituted that its self-fertilisation, or fecundation by its own pollen is, in general, easily and

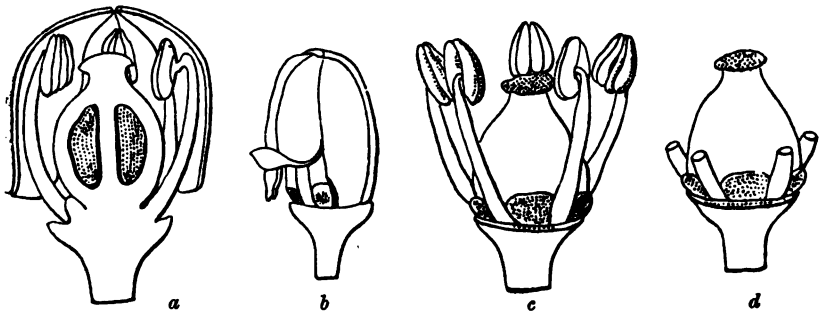

Fig. 7. FLOWER OF THE GRAPE VINE (ENLARGED).

readily accomplished, provided the pollen and the stigma be in fit condition at the same time. There is, however, except in a few varieties, almost always an abundance of pollen, and circumstances being favourable, there are not many that do not set every flower in a natural manner. It is in this facility of self-fertilisation that, in a great measure, lies the difficulty of its cross-fertilisation, although the visits of flies and other insects to the flowers in search of the nectar secreted by the green glands at the base of the ovary, *see* fig. 7 *c* and *d*, must undoubtedly bring about cross fertilisation in some cases.

Fig. 7*a* represents a longitudinal section of the flower of the Grape Vine, showing the pistil and stamens as they are situate just previous to its expansion or opening. It will be observed that the whole is at this time shut in by a sort of sheath or "cap," as it is called, formed by the united petals, which are here of a greenish colour. Fig. 7*b* represents the flower a stage further advanced, that is to say, where it shows the first signs of opening. When seen in this condition in bright sunshine, it is only a question of an hour or two for it to fully expand, for the "cap" to be thrown off, and for it to appear as in fig. 7*c*, so rapidly do the changes take place.

The act of fertilisation is effected at this period. The various segments of the sheath or "cap" roll up one after the other, until at last it rests on the point of the stamens and pistil. By a sudden jerk it is then thrown off, the stamens suddenly relieved from the pressure of the cap fly apart and at the same time the pollen is projected on to the pistil, and fertilisation is effected.

To cross-fertilise one variety with another, it is necessary to take measures in advance of the natural development, so that self-fertilisation may not be effected. To accomplish this, select, some days previously to the opening of the first flowers, the bunch which is to be operated on as the female or seed-bearing parent; cut away all the flowers, with the exception of ten or a dozen, and have these enclosed in a thin muslin bag, which must be sufficiently close in texture to keep out all insects bearing foreign pollen. It is necessary to watch and examine these flowers minutely until they appear as in fig. 7*b*; then, being provided with a pair of finely-pointed scissors or pincers, pull off the cap by force, and immediately cut away the stamens, as shown in fig. 7*d*. This is rather a delicate operation, and requires the greatest care and patience to execute without injury to the pistil or ovary, all the parts being so small, and frequently awkwardly situated.

As soon as the stamens are all cut off from those flowers which may be fit, the pollen of the sort selected for the male parent may be applied. This is best applied to the stigma surmounting the ovary of the prepared flower by means of a small camel-hair pencil. After the application, enclose the fertilised cluster in the muslin bag again, and the operation is complete. The same process will, however, have to be gone through daily, or twice a day, as the flowers may become fit, until they have all been manipulated. If a single flower be allowed to expand naturally it may ruin the whole experiment.

The choice or selection of stocks, or parents from which to raise seedlings, must be mainly determined by fancy. A tolerably safe rule to abide by is to have a good constitution in the female parent, in order to secure a good-constitutioned progeny, and to trust to the male parent for whatever peculiarity it is intended to introduce.

It has been observed that the result of the first cross has very

often been the introduction of a great mass of rubbish, but that when these crosses are again crossed, the most decided and important results are obtained. No estimate can well be formed as to the results of any particular cross. In the progeny the characters of both parents frequently appear, while sometimes those of neither can be traced. As a rule, the seedlings are generally of inferior quality, and most heterogeneous, all sorts being produced—black, white, round, ovate, etc. It is well to sow the seeds as soon as they are ripe, and grow the plants on as rapidly as possible, for if the seeds are kept until spring, a great many of them may perish, as they soon lose their vitality.

Seedling Vines are tiresome plants to fruit in pots, although it may seem a most convenient thing to do; they do not bear fruit readily or freely, and if, as is well known, a pot plant does not show fruit, a fresh plant has to be raised, thereby entailing much trouble and risk of losing the variety. The best plan, therefore, as well as the most satisfactory, is to plant them out in some temporary position, where they can be allowed to grow and fruit when they will—most likely in the second year—or they may be budded or grafted on to existing Vines, and so get them thoroughly tested before being approved of or condemned.

CHAPTER IV.

VINE BORDERS—THEIR FORMATION, MANURES, SOIL, ETC.

THE Grape Vine is a remarkably free-growing plant, and is found in a state of great luxuriance under many very opposite conditions, and in soils of a widely different character. The consistency of the soil, its mechanical composition, so to speak, appears to be of far more importance than the actual ingredients themselves of which it may be composed. For example, we know of Vines doing remarkably well on very calcareous soils, on deep alluvial loams, on very shallow soils, where the roots penetrate into the fissures of the rocks in search of food, yea, on heaps of stone almost, as well as in beds of the richest manure. The Vine, however, is never found to succeed in wet, clayey, tenacious soils; a certain amount of aëration and porosity of the soil seems to be an absolute necessity, with an abundance of water at certain seasons. From these general principles, therefore, it will be seen that it is not so very difficult to arrive at a knowledge of the kind of soil best suited for the cultivation of the Vine, and that the formation of a Vine border is a task, the carrying out of which does not require any very great skill.

Soils.—The soil best suited in itself for the growth of the Vine is a fibry calcareous yellow or virgin loam. No analysis that can be given will convey much information as to the exact constituents of the soil that is meant, which is that termed "fibry yellow loam," although by every Vine cultivator the designation is well understood. It is the top-soil or turf, cut from two to four inches thick, from an old pasture or field. It is "fibry," from containing all the fibrous roots of the herbage or grass growing on it. It is "yellow," by reason of its not having been in cultivation for some considerable time, so that it contains little or no organic matter. Soils under cultivation, by having organic matter introduced, soon lose this yellow and fresh appearance. The term "virgin" loam is sometimes used. Indeed, the word "loam" itself is one of wide meaning, since soils that are termed "loamy" range from sand to clay; thus we have what is termed "sandy loam," and also "clayey loam." It is the intermediate order or quality of loamy soil that is best suited for the Vine, a fibry yellow loam of a calcareous nature, neither too light and sandy, nor too heavy and adhesive, but yet possessing some degree of holding substance.

"This soil will breed in rampant health the Vine,
And gushing with a perfect wealth of wine,
A mass of Grapes in clusters manifold."
The Georgics of Virgil (Blackmore).

Where such a soil can be procured, it should be cut from an open pasture, not from a wood or near the roots of trees, lest pieces of wood or of roots remain to decay and cause fungus. It should also be cut while it is dry. Many soils are quite spoilt by being handled whilst they are in a wet condition. Chop the turves with the grass and fibre roughly to pieces, and to five or six cubic yards of this material add one yard of old lime rubbish or broken bricks, a portion of charcoal, wood-ashes, or burnt soil, and about two hundred-weight of half-inch dried ground bones. These ingredients, well mixed, will constitute the main body of soil to be used, but is subject, of course, to considerable modification as to proportions, according to the quality of the loam that is made use of. If the loam used is of a sandy nature, less of the lime rubbish must be used, as the object in using this is mainly to give porosity to the soil. If, on the other hand, it is of a clayey nature, a much greater proportion of lime rubbish will be required.

In many places it may be very difficult to obtain soil at all approaching that which is here recommended, but let no one despair of cultivating Grapes on that account. Vines will grow, and grow well, in soils of a much inferior nature under careful management. We recommend that which we consider the best, and it is for the cultivator to get some as near like it as possible. In our own experience we have often had to use soils of a very inferior quality—old and exhausted garden soil, without a vestige of fibre—in the formation of Vine borders, trusting to the after-management, to top-dressings, and so forth, to make up for the deficiencies. In short, in choosing soil for growing Vines, choose the newest and freshest that may be obtainable, although, perchance, it may not be, or may not appear so rich as some other that has been in cultivation; yet it will be found more enduring, and better suited in every respect, when the other ingredients mentioned are added in their proper proportion, for the production of Grapes and the general constitution of the Vine.

Manures.—For the growth of Vines nearly all soils require the addition of some fertilising ingredients—some kind of manure. The character of soil most suitable for the Vine, and the mechanical construction of the border being settled, the next point for consideration is that of enriching the soil; for where soils are poor, the question of manures becomes an important matter. Not very many years ago it was the popular belief and custom in the formation of a Vine border to bury the carcases of animals—such as horses, cows, etc.—in the border, under the mistaken idea that the roots of the Vines revelled in such putrid matter; a more stupid idea never existed. At the present time very different notions prevail in regard to manures, and also the making of Vine borders. Some of the best cultivators now have their soils analysed with great care, and the different ingredients, of which they may be found deficient, added

with mathematical precision. Analyses are, however, sometimes misleading, as the soil may contain elements which, in certain conditions, are valueless to the plants.

In the formation of the Vine border, which is intended to be of a permanent nature, the manures that may be used should be of a lasting character, so that they will afford support to the Vines as long as possible. For top-dressing, immediate action is desirable; in which case the manures should be readily available.

Manures are of two classes:—The organic—those of vegetable or animal origin; and the inorganic—those of mineral origin. Of organic manures, that may be used for Grapes, the principal is that of stable or farm-yard manure; this has generally been recommended for mixing with the soil in the formation of the border. It is objectionable, however, on this account, that it very rapidly decays, and its influence is soon exhausted. Some cultivators—notably, Mr. Philip Ladds, Bexley Heath—use stable manure extensively, and secure heavy crops for a few years. As a top-dressing, mixed with the soil or otherwise, it is more especially valuable. Bones, as containing phosphate of lime, constitute one of the best manurial ingredients for Vines; they are slow to decay, and so continue to give sustenance for many years. The best size to use are those which are sold as half-inch ground bones, large bones, such as are sometimes used, being of little use. Bone meal, dissolved bones, and horn shavings are all valuable ingredients of a similar character, presented in a more readily available form, and, consequently, more immediately effective. Guano has also been used with satisfactory results, but from its powerful nature, requires caution in its application. The quantity of ammonia present in guano is its chief value, ammonia being the source from which plants derive their nitrogen. An excess of nitrogenous manure, it may be pointed out, is likely to favour leaf growth rather than the formation of fruit, but a proper admixture of nitrogenous and of mineral manures is likely to be most advantageous if water be very liberally applied in the growing season.

Of inorganic or chemical manures, and which are also known as "artificial" manures, it is only of recent years that they have come much into use for Grapes; some of the most successful growers now use them largely, and with beneficial results. From the analysis of the Vine, it is ascertained that potash forms one of its chief constituents. Ville, the eminent French chemist, in his experiments, proved that Grapes could not be grown without potash. Argal, or tartar, it may be observed, is procured from the lees of Grapes. It is, therefore, easy to arrive at the conclusion that what enters so largely into the constitution of a plant, must, of necessity, be required by that plant in some form or other.

Potash manures are, therefore, of special value for Vines in all cases where the soil is defective of this ingredient; indirectly, potash

is applied with other manures, of which it forms a part—the value of wood ashes as a manure arises from this. For direct application to the soil, nitrate of potash, otherwise nitre of saltpetre, in a powdered state may be used. Sulphate, or chloride of potash, answers the same purpose; one pound of either of these salts mixed with an equal quantity of sulphate of lime, otherwise gypsum, will make an excellent top-dressing for a small Vine border; this should be slightly forked into the soil, and well watered. Superphosphate of lime is also to be recommended for occasional application, in the same manner, during the growing season. The late Mr. Bashford, one of the largest and most successful cultivators in Jersey, used a mixture of half-hundredweight of the superphosphate to one hundredweight of nitrate of potash, giving one pound of this mixture to the square yard. The following mixture has also been found highly efficient :—

Dissolved Bones - - - - - - -	2 cwt.
Nitrate of Potash - - - - - - -	1 „
Sulphate of Lime - - - - - - -	1 „

Using two pounds to the square yard, and repeating the application at intervals of three or four weeks during the season, according to the appearance of the Vines. Many patent manures have been recommended, mostly at extremely high prices, and which are mainly composed of the ingredients we have enumerated—or others of lesser importance and value. The best of these prepared manures that has come under our notice, and which we have used with very great success, is "Thomson's Vine Manure." One hundredweight of this manure to every four tons of soil is recommended for making a new Vine border, and for top-dressing one pound to the superficial yard twice during the season. Much, however, in regard to the application of manures, must be governed by the character of soil used; by experience alone can the requisite knowledge be acquired.

Size of Border.—The Vine may be grown in a very small space, and in a very little soil, as is evidenced by the splendid results obtained by its cultivation in pots. This pot system may be termed "high pressure" cultivation, and, as a consequence, such Vines are soon exhausted and worn out—one crop for one season and they are done. In larger tubs or boxes they last a little longer; and so, in regular proportions, no doubt, according to the quantity of soil and the nourishment supplied (although the ratio may be somewhat difficult to estimate correctly), is the vigour of the Vine maintained. If permanent Vines are desired—Vines that will continue in full vigour for, say, twenty years—a border of considerable size must be provided. In small narrow borders, with a restricted quantity of soil, success for a time may be very great, but that can only be maintained by the application of much nourishment in the way of top-dressings, and by renewal of the soil, etc., which becomes expensive. Many good cultivators form their Vine borders in sections, *i.e.*, three or four feet is

made up the first season, a similar portion is added the following year, and so on, until the required space is filled.

A very good rule to go by, and one which gives a very fair proportion, is that of making the width of the border equal to the width of the house itself. Thus, for a house ten feet wide, a border ten feet wide would be required; and for a sixteen feet Vinery a sixteen feet border, and so on. The border should in all cases be from two to three feet in depth; it should never be less than two feet, and seldom more than three (*see* fig. 8). A shallow border is apt to become too dry, and requires great care and attention as to watering, and the keeping up of a proper degree of moisture; whilst a deep border is apt to get soddened, and for the roots to penetrate beyond the solar influence.

The roots of the Vine travel a long way in search of nourishment; there are instances of them having been found from sixty to a hundred feet away, so that, although some limit must be fixed for the size of the border, a greater extent would, of course, be no disadvantage. Indeed, in most of the borders prepared in the ordinary way, where no means have been adopted to confine or restrict the passage of the roots, the greater portion of these latter have passed through all the carefully prepared border into the outlying soil, and are thus beyond the control of the cultivator, and outside the influence of his treatment. Unless the natural soil of the place be conducive to the well-being of the Vine, the roots should always be restricted to the prescribed space that has been specially prepared for their well-being.

Inside v. Outside Borders.—Much discussion has taken place as to the relative merits or advantages of having the Vine planted inside—with the roots inside—or in borders outside the house. Inside borders are specially under the control of the cultivator. The Vines growing therein are in a degree as dependent on his careful attention and skill as those growing in pots. Every particle of nourishment and moisture has to be supplied. It is, therefore, manifest, that in cold, wet, low-lying situations, in the hands of the skilful cultivator, there is much to be said in favour of "inside borders" for early forcing and for very late-keeping Grapes. The disadvantages are these: — The great amount of labour, etc., required in watering, and the skill and care necessary in keeping up the requisite degree of moisture at the roots. A scarcity of water, or a little neglect in its application, will ruin the crop. On the other hand, outside borders require little attention in regard to watering, being exposed to the ordinary rain, they only require attention in very dry times. Many amateur cultivators never think of watering their Vine borders, although frequently they would be greatly benefited thereby. For the general crop of Grapes, therefore, and for all ordinary cultivation where superior skill and constant care cannot be administered, "outside" borders are far preferable to "inside" ones.

A very common practice is to form the borders both outside and inside, the front wall being erected on arches, so that the Vines which are planted inside may have liberty for their roots to go either way. It has often been noticed in cases of this sort how great a per centage of the roots are to be found in the outside border, that being generally the moister of the two. It is a fact worthy of notice that the greater portion of the ravages committed by the *Phylloxera* in this country have been in dry inside borders, the insect having seldom if ever been found in the more moist soil outside. This, if not testimony exactly in favour of outside borders, at least points to the suppression of this great pest, the *Phylloxera*, by the application of water.

Drainage.—This is one of the most important operations in the formation of a Vine border, and one that, in some situations, entails a considerable amount of expense and trouble to render it efficient. It is a point that always must be taken into consideration in selecting the position for a Vinery, for if the soil cannot be drained freely and easily, the site is not a proper one for the cultivation of Grapes. Since Vines will not succeed well in a low, damp situation, it is best to choose for them a rather high position, though not necessarily an exposed one; on a gentle incline, it may be, where the work of drainage will be almost accomplished. Many gardens with gravelly subsoil, even if on the level, are well drained naturally, and so require little preparation; but it is not well to trust much to the natural conditions, though they are apparently favourable. It is better to take all ordinary precautions at the first, rather than to run any risks, and then, after several years of loss and disappointment, to have all the work to do over again.

In every case, therefore, a considerable amount of draining material should be placed over the whole surface of the bed of the border—say from one to two feet or more in depth, according to the breadth of the border, the nature of the subsoil, etc. At the back of the border, for example, we should place a depth of two feet of drainage, allowing it a slope to eighteen inches at the front, where a drain twelve inches lower still should be formed, to carry off all superabundant moisture. The best material, generally very accessible, for the drainage of a Vine border will be found in old brick and lime rubbish, the rougher and larger pieces being placed at the bottom, finishing with the finer on the top, these forming a barrier which prevents the soil being washed down amongst the drainage materials.

In cold, wet, clayey soils, it is advisable to place a layer of concrete over the bottom of the border. This will prevent the damp from rising, and cut off any possibility of the roots descending; but even in this case it is still advisable to place over the concrete the bed of brick-rubbish, as already recommended. The beneficial effect of drainage is not alone that of drawing off the superfluous moisture, but the consequence of this being done is to raise the temperature of the

soil. A well-drained border is not only drier, but warmer by a good many degrees than a water-logged or undrained one. No better illustration than this can be given of the immense importance of thorough drainage for the roots of the Vine.

Raised or Terraced Borders.—In low-lying situations, the plan of raising the borders above the level of the surrounding soil is greatly to be recommended. The border thus forms, as it were, a sort of raised terrace, the height of which may, and will, vary, of course, according to circumstances; but it need seldom exceed the intended depth of prepared soil, the drainage material commencing at the natural or surface-level of the ground. A border raised in this way will be comparatively warm and dry, by reason of its elevation.

In the formation of a Vine border, it will thus be seen that every contingency ought to be taken into consideration, not only the position or situation, but also the level of the border itself. The amount of excavation necessary in making up the border will be determined by its depth, measuring from the surface-level; thus a border raised two and a half feet requires only to be excavated to a depth sufficient to hold the drainage. It is a piece of folly often perpetrated to dig for the Vine border a large deep hole, which it is impossible to drain, and which, therefore, when filled with rubble, becomes a great well or cess-pool for the drainage of the surrounding ground. Than this, nothing could be much more injurious to the roots of Vines. The lowest part of the foundation of the border should be provided with a thoroughly efficient drain.

Heated Borders.—Vine borders may be heated artificially in a variety of ways. For example, by their formation over heated tanks, or by hot-water pipes placed in various positions, etc., on which we need not here enlarge. For exceptional cases, where extra early forcing is required, some means of this sort may be adopted with advantage; but experience has proved that, in a general way, but little advantage is secured as compared with the increased cost of the heating, besides which they are liable to become over dry, and, in this way, hurtful to the Vine roots.

Aërated Borders are so called through having a series of drain-tiles or pipes, communicating with the outer air, placed underneath the soil amongst the drainage material. These serve, to some extent, to warm the border, and to sweeten and purify the materials of which it is composed. There can be little doubt that considerable benefit is derived by the adoption of some means of this sort in low-lying situations. It is, in truth, but an elaborate system of drainage, excellent in theory, and efficient when well carried out, but often failing in action, and for general purposes not requisite.

Covering.—It has long been customary, and so has come to be considered necessary, that Vine borders should be at all times covered

with some fermenting material. It is, however, not necessary in ordinary cases. The beneficial effects of the frost on the soil is well known, and it is good practice to expose the soil of a Vine border to its action as much as possible. For early forcing, a good covering of dry leaves, or a continued supply of hot fermenting manure and leaves is very beneficial, not only from its warding off cold rains, etc., but from its keeping up the temperature of the border. For late and general purposes, the border is better exposed to the full and free action of the weather.

Mulching.—This is very necessary, not only as a means of enrichment of the soil, but also for the prevention of evaporation, whereby a greater and more constant degree of humidity is maintained. Therefore, as soon as the Vines get into full leaf, a good dressing of several inches of the best manure attainable should be applied, and this should be renewed from time to time as required, until the Grapes begin to colour. This dressing or mulching of manure induces the emission of numerous surface-roots, and in poor soils is the chief and best mode of supplying sustenance to the Vines.

Watering.—A great deal depends on the efficient manner in which this operation is carried out. More Vines are ruined through want of water, perhaps, than from any other cause. The quantity of water which Vines require in well-drained borders is astonishing. They can scarcely receive an over-supply during the growing season. Inside borders require the most attention in respect to watering. Before the Vines are started into growth, every particle of soil should be thoroughly saturated, and from the time they come into leaf until the ripening of the fruit, a frequent supply of manure-water should be given. Outside as well as inside borders should receive constant attention as to watering during the summer, but no special rules as to time or quantity can be given, so much depending upon the nature of the soil used, its composition and drainage. When the fruit is ripe, a somewhat drier condition should be maintained, but it is not advisable to allow the soil to become dry even then.

Renovating Old or Exhausted Borders.—Old and apparently worn-out Vines are sometimes restored to comparative vigour by the removal of the effete soil, and the supply of fresh material to the roots; it is often advisable to do this. The total renewal of a Vinery —Vines, border, and all, is not at all times expedient excepting in large establishments, where other houses may supply the temporary want; it means the loss of a few years' crop of fruit, and this is rather a serious matter. It is the fear of this loss, however little it may be, that often prevents the adoption of any adequate means of improvement; but be it known to all concerned, that by careful and judicious management, Vine-borders may be renewed entirely without any loss whatever. If this fact were fully recognised, we might, as a consequence, see fewer poor Grapes. One difficulty in the way of

accomplishing this renewal, is to have ripe the fruit the Vines may be producing in time for the operation to be performed sufficiently early to get the roots in action in the new soil before the end of the season. This is the great end to be achieved. The mere renewal of the soil is easily performed.

As soon, therefore, as the fruit may be cut, whilst the leaves are yet fresh and green, say, about the end of July, commence by clearing away the old soil, tracing out carefully all the roots that may be found; these must be shaded and protected from the sun, and, moreover, frequently syringed to keep them moist. Then make up the border with fresh soil as already recommended, and carefully replant the roots as soon as possible. Much depends upon the time taken up in doing this, as the Vine roots suffer much if kept long out of the soil; but if proper care be taken, a few days under these conditions will not cause them material injury.

If the roots have been much interfered with, it is necessary to completely shade the Vines at this time, and to maintain about them a close, warm, genial atmosphere; that is, the atmosphere of the house must be completely saturated with moisture and the Vines frequently syringed, so as to cause them to commence active growth again. When this is accomplished, the roots will also be getting established, and after about a month or so, the ordinary treatment may be resumed.

Another mode of renewal often adopted, where the roots exist partly in the inside and partly in the outside border, is to entirely renew the inside one season, and the outside the following. The roots in this case may be considerably shortened. Some daring cultivators will also partially renew a Vine border by boldly clearing away a certain portion, roots and all, and refilling the space with fresh soil.

The commonest practice, however, is to clear away as much of the top-soil as possible, laying the roots bare, and then adding fresh soil. This, in a lesser degree, would be called *Top-dressing*. The top-dressing material should consist of good loam, and be rather richer than that recommended for the formation of the border (*see* Manures, p. 21). Any depth of this may be applied, and if properly attended to in regard to moisture, the roots will soon permeate through the entire mass, and great benefit will be derived by the Vines. All these partial renewals may be effected during the autumn, or when the Vines may be said to be at rest.

CHAPTER V.

STRUCTURES FOR GRAPE GROWING.

AS regards Structures or Houses for the cultivation of Grapes, the greatest latitude may be allowed. Vines are most accommodating in this respect, and will grow in structures of any form or size that either convenience or fancy may dictate, provided the atmospheric conditions are made suitable. It is not to be assumed, however, that certain structures are not better adapted for their respective requirements than others. It is the little differences or deviations from this or that line that lead on to failure or success, as the case may be. The two extremes are seldom far apart. The conditions that may prove satisfactory in one sense, do not always avail in others. The mere growth of the Vine itself is one thing, whilst the production of fruit, early or late, and its proper maturation and conservation, are totally distinct matters. A house which may be very suitable for early Grapes, may be unsuitable for late crops, and *vice versâ*. It is very wonderful to notice the great crops of Grapes, and these of fine quality too, that are sometimes produced in houses or Vineries that can scarcely be called suitable, and which should never be taken as models to be followed in the erection of Vine-houses. A great many blunders are committed in this way: peradventure, through pure accident it may be, a certain thing is a success; it is thereupon copied, with all its faults, and failure is the common and natural result.

Vineries, that is to say, the structures set apart for Vine culture, are of three classes:—

1. *Early Vineries*, for the production of early or forced Grapes.
2. *General-crop Vineries*, including all unheated houses.
3. *Late Vineries*, for the production and proper keeping of Grapes till late in the season.

A Vinery specially designed for one of these purposes may be very unsuitable for the others; special arrangements are required in each case, but we can here do little more than glance at general principles, leaving the details to be fitted to each particular case.

The annexed illustration, fig. 8, in which the construction of the border is illustrated, represents what is termed a lean-to Vinery—that is, a house leaning to or against a wall. This is the oldest, simplest, and cheapest style of house that can be erected, advantage being generally taken of some already existing wall against which to place it.

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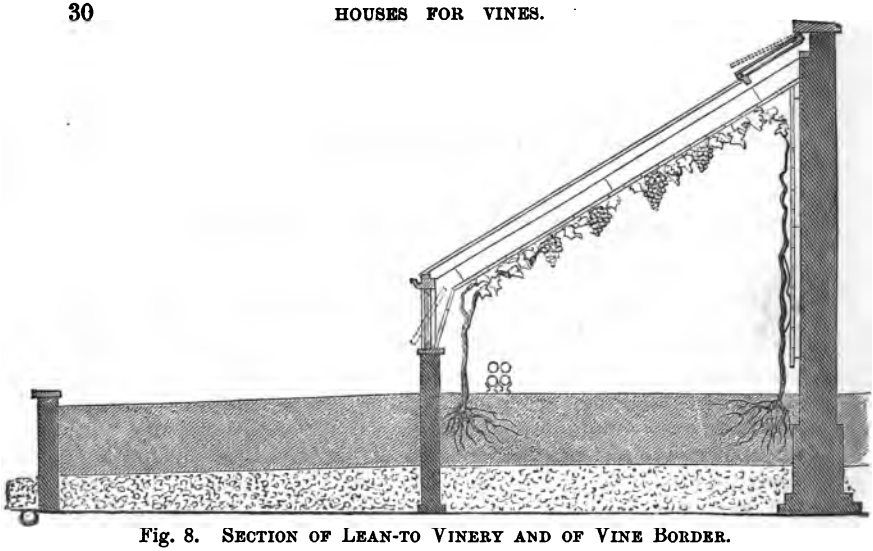

Fig. 8. SECTION OF LEAN-TO VINERY AND OF VINE BORDER.

The Vines in this case are planted along the front, and the rods trained up under the roof. A second set may also be planted against the back wall, and these will produce good fruit for a time, or so long as they are not shaded by the others.

Lean-to houses are generally erected to face the south, so that the full benefit of the sun's rays may be secured. This position for early houses is a great consideration, but for later houses it is of less consequence, as good black Grapes may be grown in houses having a due north aspect. For early forcing, the lean-to Vinery is the most

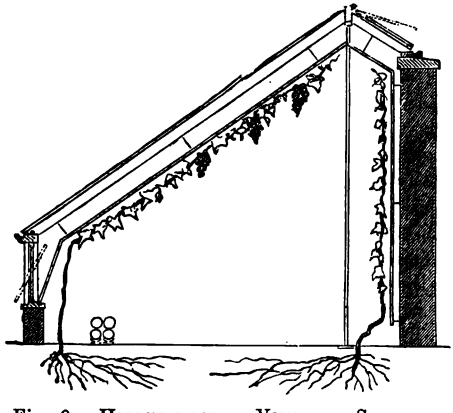

Fig. 9. HIPPED-ROOFED VINERY.—SECTION.

approved. It is naturally warmer, the back wall affording considerable shelter, and on this account it is the best adapted for cold or exposed localities. Fig. 8 represents a house about fifteen feet in width, with a roof at an angle of forty degrees. This may be made much more acute, and the whole modified as may seem desirable; but very steep lean-to Vineries are extremely sensitive to a too rapid rise of temperature, and require great care in ventilation, to prevent the consequent scorching of the Vines.

Fig. 9 represents what is generally termed a three-quarters span or hipped-roof Vinery. It is a combination of the lean-to and span-roof, and unites to a great degree the advantages of both styles. For general purposes there is no better form of Vinery than this, and it admits of easy and thorough ventilation by the short lights at the back, without in anyway interfering with the front roof of the house. The Vines in a house of this sort are planted as recommended for the lean-to Vinery, and the best aspect is as nearly due south as possible. For Muscat Grapes, requiring a high temperature and plenty of sunlight, the three-quarters span is greatly to be recommended, as also for late-keeping Grapes.

We also give representations, figs. 10 and 11, of a span-roofed Vinery, so called from the roof forming a span or arch. This style of structure has become extremely popular since the days of cheap hot-houses. It is the most elegant and ornamental, especially in isolated positions. There is no other form of Vinery nearly so pretty, or one which affords so much roof space for the development of the Vines. For the general cultivation of Grapes, the span-roof Vinery answers extremely well. The whole being glass, the amount of air and light admitted is very great, and this is decidedly beneficial to the Vines at certain seasons. The disadvantages are, that having so large a glazed or cooling surface exposed, it is much more difficult to maintain a high or regular temperature in a house of this form. On this account span-roofed houses are not so well adapted for early forcing or for the cultivation of Muscat Grapes.

In regard to position or aspect, the rule for span-roofed houses is the reverse of that which has been recommended for the other forms. The best and greatest results are here obtained by placing the ridge due north and south, the one side thus facing east, and receiving the full benefit of the morning sun, whilst the other being due west, receives in a like manner the afternoon sun, the direct or mid-day sun striking somewhat obliquely on both sides. Thus both sides receive about an equal amount, and a much longer continuance of the vertical rays of the sun than could be secured by adopting any other position. In the case of a span-roofed house placed so that one side faces south, the other must be due north, and under such circumstances the Vines on the south side receive all the benefit of the solar rays, and those on the north are

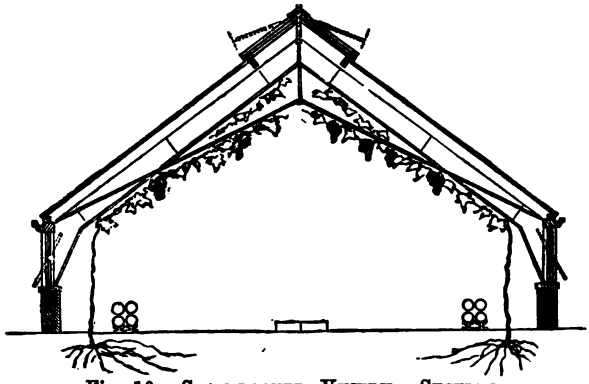

Fig. 10. SPAN-ROOFED VINERY.—SECTION.

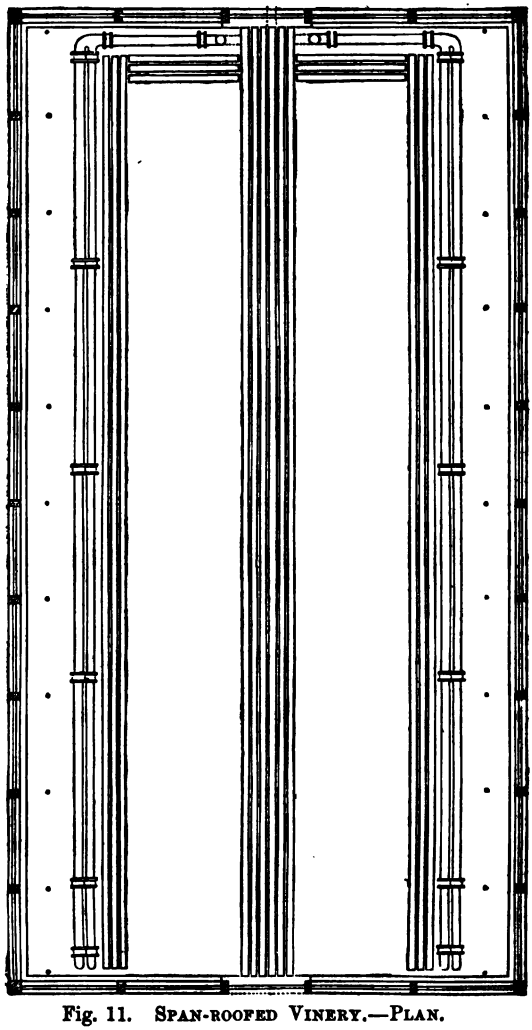

Fig. 11. SPAN-ROOFED VINERY.—PLAN.

consequently shaded—and Vines never do well in shade. For more northern or colder localities, a more acute or steeper angle of roof is recommended.

The trellis provided for the training of the Vines should be of galvanised wire, and fixed not less than eighteen inches from the glass, if the height of the house will permit. We prefer straining the wires longitudinally from one end to the other, at about ten inches apart, long eyes being fixed in the rafters to suspend them. For Vines against the walls, the wires should be placed at a distance from the wall of about six inches.

The ground-plan (fig. 11) shows the Vines planted at four feet apart on each side, and indicates the position of the pipes, trellis, paths, etc., in a span-roofed Vinery.

CHAPTER VI.

HEATING OF VINERIES.

A VINERY is not complete until it be efficiently heated. Heat—*i.e.*, artificial heat—being therefore requisite for the higher cultivation of the Grape Vine, it becomes necessary to take into consideration the best means of securing its proper application.

Artificial heat, in distinction from solar heat, may be derived from various sources, and applied in various ways. For Vines and Vineries it is not necessary to allude to other sources than the following:—

1. *Flues.*—This, which is the oldest system, is still to be met with in some old gardens, but is now seldom introduced. Flues are objectionable on account of the great amount of space they occupy in the interior of the house, and also on account of the very arid heat they supply, necessitating extreme care in maintaining a sufficiently moist atmosphere, and in preventing scorching, and the intrusion of red spider and other insects.

2. *Hot Water.*—This is the system almost universally adopted at the present day for horticultural purposes, and is superior to all others. The only questions that may arise in regard to hot-water heating are—the position of the piping, and the extent or quantity required for particular purposes. As to the position of the piping, if we take into consideration that the heat is obtained from the pipes by radiation, and that heated air naturally moves upwards, it is at once apparent that the heating material, or piping, should be placed at the lowest and coldest part of the house. The practice, therefore, is to fix the piping as shown in the several sections of Vineries, figs, 8, 9, and 10, viz., at the front, and near to the ventilators.

As to the extent or quantity of piping, this is, and must be, regulated by the special requirements in each case. An extra, rather than under, supply is preferable at all times, so as to avoid keeping the pipes at a very high temperature, which is injurious to vegetation.

As regards boilers, according to our experience, for general use, the Terminal-end Saddle Boiler is one of the simplest and most efficient, and will answer all practical purposes. (*See* Chap. xxii.).

CHAPTER VII.

PLANTING VINES—WHEN AND HOW TO DO IT.

VINES may be planted at any season of the year, provided all the requisite conditions are fulfilled. The usual practice is to plant the ripened canes of the previous season's growth, such as that shown in fig. 12, which is a Pot-Vine, termed a "Planter." In the majority of cases these have to be received from the nursery at the end of the season, and the earlier they are obtained and planted the better. October is a very good period for planting. Vines planted then commence a little root-action, and get, to some extent, established before the spring.

It is not advisable to plant in the mid-winter months, especially in outside borders, as the soil is then very cold and wet. If Vines cannot be planted before November it is far better to defer the operation till the spring, say at the end of January or beginning of February; later in the season they will be commencing to grow, and cannot then, with safety, be pruned or cut as may be required.

In planting young Vines from pots the soil should be shaken away, and the roots spread out fully, and laid as near the surface as may be possible; the soil should then be filled in, made firm, and, if necessary, watered in the usual way.

Another method, which is greatly to be recommended, is to plant the young growing Vines that have been raised from eyes during the same season. For those who have the convenience to raise their own Vines, and to plant them out in the month of May or during any of the summer months, there is a gain of, at least, one year's growth. This, of course, can only be practised where the Vines are planted in the inside borders. The difficulty of carriage, and the consequent damage to the tender-growing plants prevents the nurserymen from supplying Vines for planting in this condition to any extent, otherwise it would be largely adopted. We have planted Vines in May from six-inch pots that have made rods thirty feet in length the same season, and formed stems of corresponding thickness. We have also planted in June and July with nearly equal success. In planting these growing Vines from pots the ball need not be broken, as the roots have not yet become matted, and consequently, if the soil is pressed gently around them, and well watered, there is no check; and growth commences immediately.

Mr. Thomson, when at Dalkeith, adopted the plan of raising Vines

from eyes struck in square pieces of turf instead of pots; in these the Vines rooted, and were placed in the border without disturbance—a very simple and efficient method.

Distance apart at which to Plant. — This depends, to a great extent, on the style or mode of training to be adopted. If we here consider the rods or stems as separate plants we must then allow space between the stems for the proper development or extension of the side or bearing shoots, and as these extend from two to two feet six inches on either side, it follows that a space of from four to five feet is required. Some of the best cultivators have the stems seven feet apart, being of opinion that more space and light are necessary for these Grapes. For permanent Vines the distance of five feet is not at all too much, although frequently they are planted much closer. Growers for market frequently plant at from two to two feet six inches apart, but such Vines are only of a temporary character. Other cultivators plant what are termed the permanent Vines at five feet apart, and introduce supernumerary plants between them to produce a crop while the permanent Vines are growing up, when they are cut out, and their space occupied by the latter. Some of the market-growers are now trying the plan of planting the Vines inside the houses in lines, at from three to five feet apart, and training them to upright poles, eight to ten feet in height, as in some Vineyards, and as practised with Tomatos. The objection to this system is the one plant shading the other, so that the inner and lower buds do not get properly ripened, and soon become enfeebled.

CHAPTER VIII.

THE GENERAL MANAGEMENT OF VINERIES.

BY Management is here meant all that relates to the maintenance, in the houses, of those atmospheric conditions that may be requisite for the proper cultivation or development of the Vines or their fruit. Requirements vary so much that it would be simply impossible, even were it desirable, to lay down hard and fast rules to be followed in every case; much, very much, must always be left to the discretion of the cultivator.

Forcing.—Since the introduction of cheap glass, orchard houses, ground vineries, and other unheated structures for the cultivation of the Vine, this term, at one time very expressive of a definite condition, has become nearly obsolete. Any means that may be adopted for the forwarding of the growth of a plant to a greater extent than would take place naturally, may be termed forcing. Heat is the motive power. The Vine growing in an unheated orchard house—that is, not heated artificially—is forced by solar heat to a certain degree. Some Vines are forced in spring, to induce them to commence growth early; others require forcing in autumn, to ripen their fruit.

Vines may be forced into growth and bear fruit at any season of the year, provided—provided always—that the wood is properly ripened. Early-forced Vines of one season force more easily the following year, and established Vines always more easily than young ones; indeed, young Vines, excepting it may be pot plants, should not be hard forced.

To secure early Grapes, say in April, the Vines should be started into growth in November. The period of time required from the commencement of growth to the ripening of the fruit is, for the Black Hamburgh, about five months. Thus, Vines started in March should have fruit ripe in July, and those coming naturally into growth by the end of March, in August and September. The Muscat of Alexandria, Gros Colman, Alicante, Lady Downe's Seedling, and other late Grapes, require nearly six months to ripen and finish properly.

All Vines should be started sufficiently early to have the fruit ripe by the early part of September; Grapes ripened later than September require a great amount of firing to finish them, and do not keep well through the winter. The Grapes ripened in September are the latest to arrive at full maturity. *See* chap. xiii.

If, say on January 1st, we take as an example a Vinery from which

ripe Grapes are required to be cut in the month of June, the management or treatment necessary to secure this end may be stated in general terms, as follows :—

1. *Temperature.*—At the commencement, a night temperature of about 60° will be sufficient until the Vines have started to grow. The heat should be raised gradually to 70° by the time they come into flower. When the Grapes are fairly set, a lower temperature may be maintained until after the stoning period, when, if necessary, a rise of a few degrees may be allowed. When the Grapes commence colouring a lower temperature may be maintained, but fire-heat is very frequently required in order to maintain a bracing atmosphere.

For day temperatures a rise of 5° by fire heat may be allowed in dull cold weather, and of 10° or more, if by sun-heat, up to 80° or 90°, as the season advances. In very cold weather, however, it is better to have a lower temperature than to maintain a high one by overheated pipes.

2. *Ventilation, or Air-giving.*—The object sought to be obtained by ventilation is not merely the maintenance or regulation of the temperature, but also the admission of fresh air, which is a most important factor in the well-being of the Vines. The night temperatures are mostly regulated by the amount of firing or heat applied, but the day temperature, or amount of sun-heat, is regulated by ventilation. In Vineries a little air should be admitted by the top ventilators early in the morning, or as soon as it may be observed that the temperature has risen or is rising above the required point, and this air should be gradually increased as the day and the temperature advances, and should also be reduced in a like manner in the afternoon, endeavouring, if possible, to close early enough to secure a slight rise in the temperature after doing so. We prefer closing early at all times, and "bottling up," as it were, the sun's warm rays, to the rigid rule of keeping to a given temperature, and the consequent early application of fire-heat for its maintenance. As the Grapes commence colouring, air must be given freely both by day and by night, on both sides of the house, etc., for the admission of brisk fresh air.

Moisture.—This, in its relation to the atmosphere, is of the greatest importance to the healthy progress of the Vine, and demands special attention. A close moist atmosphere is necessary to induce the buds to break freely, and afterwards it is necessary to assist in supplying nutriment to the Vines through the leaves. A very great proportion of the nutriment to plants is absorbed through the leaves. Again, moisture is necessary to prevent the destruction of the leaves by red spider and other insects.

From the commencement, then, a moist atmosphere must be maintained, and the higher the temperature the greater the evaporation, and the greater the amount of moisture required. It is difficult to supply too much. When the Vines are started they should be

syringed regularly several times a day, especially if the weather be bright and warm, beginning as soon as it may be noted that the temperature is rising, and so on, varying as to time according to season, etc. This treatment may be continued before the Vines come into flower, at which period a somewhat drier atmosphere should be maintained until the Grapes are fairly set. Syringing of the Vine must from this time be discontinued, as, on account of the lime present in almost all waters, the fruit and foliage become spotted and soiled by its use. Young Vines on which there is no fruit may, however, be syringed with advantage; every portion of the house and border should be freely syringed at all times, and the atmosphere thus kept well charged with moisture.

When the Grapes are colouring, a somewhat drier atmosphere is required, and by the time they are ripe, the atmosphere should be kept as dry and bracing as possible. After the Grapes are cut, if it be during the growing season, the syringe should be again freely employed to thoroughly cleanse the leaves and wood, and its use continued until they ripen off thoroughly.

All Vines in Vineries, at whatever period they may be started into growth, will require treatment or management on principles somewhat similar to those here laid down. It has been the custom of most writers on the cultivation of the Vine to give tables of temperature for both day and night, to be followed strictly during the season, but never having seen or derived any benefit from the use of such tables, we prefer to state general principles that may be understood and followed out by everyone as circumstances may admit.

CHAPTER IX.

PRUNING AND TRAINING THE VINE.

THE Vine is a free-growing long-lived plant. When young and vigorous, it grows very rapidly, the growth of a single season often attaining a length of from thirty to forty feet, or more. In its natural state the Vine is of a climbing character, sustaining itself by its tendrils, so that in its cultivated condition it has to be supported. It requires, in fact, a certain amount of training, that is, the fastening up of the shoots in some particular way, and of pruning to prevent excessive and confused extension.

There are various methods adopted in training the Vine, as being adapted for some particular place or purpose. We have, first, that adopted in the Vineyards or Vine-growing countries in the open air, where the young or fruit-bearing shoots are tied to upright poles, some six or eight feet in length, which mode of training scarcely comes within our province here. Then we have that adopted and adapted for Vines against walls, either in the open air or under glass; and we have training against trellises under glass. In the training of Vines against walls, in the open air chiefly, it has generally been the habit to introduce a more fanciful form than when they are grown against trellis-work. There can be no particular reason for this, because the mode adopted in the one case must be equally suitable in the other.

In a broad sense, we have in practice but two modes of Training and Pruning the Vine, viz., the Long-rod system, and the Spur system; some may add a third, viz., the extension system, which is a modification or an enlargement of both the others. Each of these modes is subject to all sorts of modifications, as fancy may dictate, or circumstances may allow; but before proceeding further with their explanation, it is necessary to say a word or two on pruning generally, apart from training.

To prune is to cut off, or otherwise sever, a shoot or branch from a tree or plant. Now, we prune our Vines for various reasons, as follows:—

1. We prune for the purpose of attaining greater vigour in the plant; for by cutting off a portion of a shoot or branch, the forces that would have been diffused over the whole are concentrated on the part that is left, and hence we get a stronger growth.

2. We prune for the purpose of training or securing some desired form; we prune and cut our Vines according as we desire to train them. Be it understood that the shoots of the present season are

produced from the matured buds on the shoots of the previous year, and that each is capable of producing a shoot according to the vigour of the Vine, or to the mode or manner of the pruning,

3. We prune our Vines to the end that we may obtain fruit. This is an obvious reason, though the mere act of pruning can only to a very limited extent assist in the production of the fruit. By pruning we take away many of the fruit-producing parts, but we concentrate force or power on the others. The more complete the maturity of the buds, the more likely is fruit to be produced, so that in pruning for fruit, if the wood is badly ripened, it is not advisable to prune too closely. Well-ripened Vines will, however, produce fruit from nearly every bud, so that the danger of losing a crop by too close pruning is not very great.

In order that these remarks may be more clearly understood, we shall make use of some illustrations of the various operations. We begin, therefore, with a young Vine, fig. 12, as about to be planted. It is a plant that has been grown from an eye the previous year (*see* chap. xv.—Pot-culture), and is, therefore, about twelve months old—a thin spindly thing it may be, of from three to four feet long, ready to be planted during the early winter or spring months.

The first question that is generally asked by the uninitiated is this: "To what length shall I prune my newly-planted Vines?" Our general answer is, "Cut them as low down as you can." When planted in such a position that the whole cane—right down to the ground—is fully exposed to the solar influences, cut it down, as shown by the figure, to within three or four inches of the ground. It is no matter what the strength of the plant may be; the lower it is cut down, the stronger it will grow, and the better foundation it will make for the future. There are situations, however, where the young Vines cannot be cut down so low as this, namely, when planted against the low, front wall of a house, to be trained up to the rafters, either outside or inside. Here there is frequently three feet or more of the stem comparatively in the shade or in the cold. For this purpose stronger Vines are required, and the rule for pruning should be to cut them at from two to three eyes above the level of the wall plate, *i.e.*, above the line of light. A very good rule is to prune, say to the lowest point, whence the foliage produced can have the full influences of light and air. Once fairly started, young Vines are all the better, for the first summer, if allowed to grow and ramble pretty freely, with as little checking and stopping as possible. The more leaves and shoots developed the more roots produced, and the stronger the foundation laid for the future.

Spur Pruning.—The spur system of pruning is the method most generally adopted in this country. The practice has generally been to confine the Vine to a single stem; some growers, however, prefer to plant at a wider distance apart, and take up two stems in the form

of the letters ⋃ and |—thus, ⋃|, or even three or more as the case may be. As this is, however, a mere matter of training, and the treatment as regards pruning required for the one kind of stem is exactly the

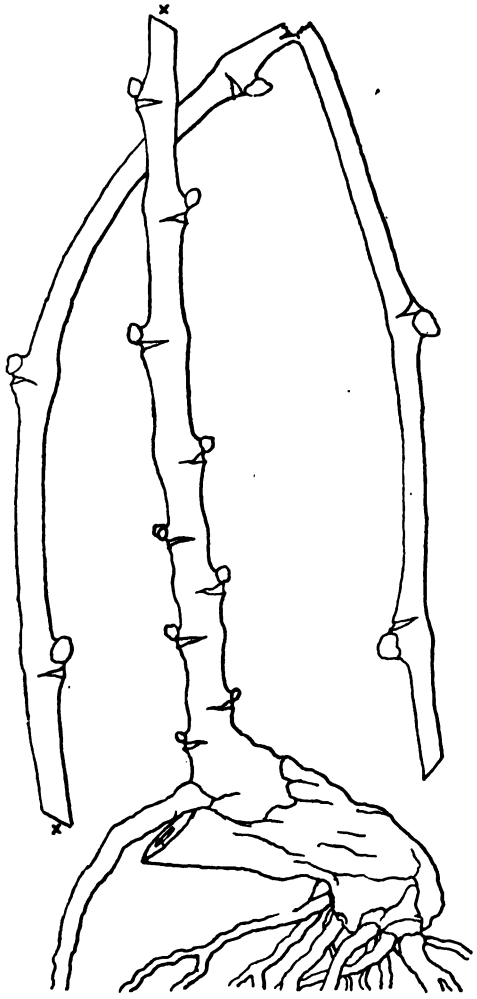

Fig. 12. YOUNG VINE CUT BACK (REDUCED).

same as for the other, our remarks, although descriptive of the treatment of the one stem only, may be taken as applicable to any number.

In fig. 13, which represents a portion of the stem of a Vine, at the end of its first year's growth after being planted out, preparatory to pruning, A represents the upper portion of the stem of fig. 12, left at

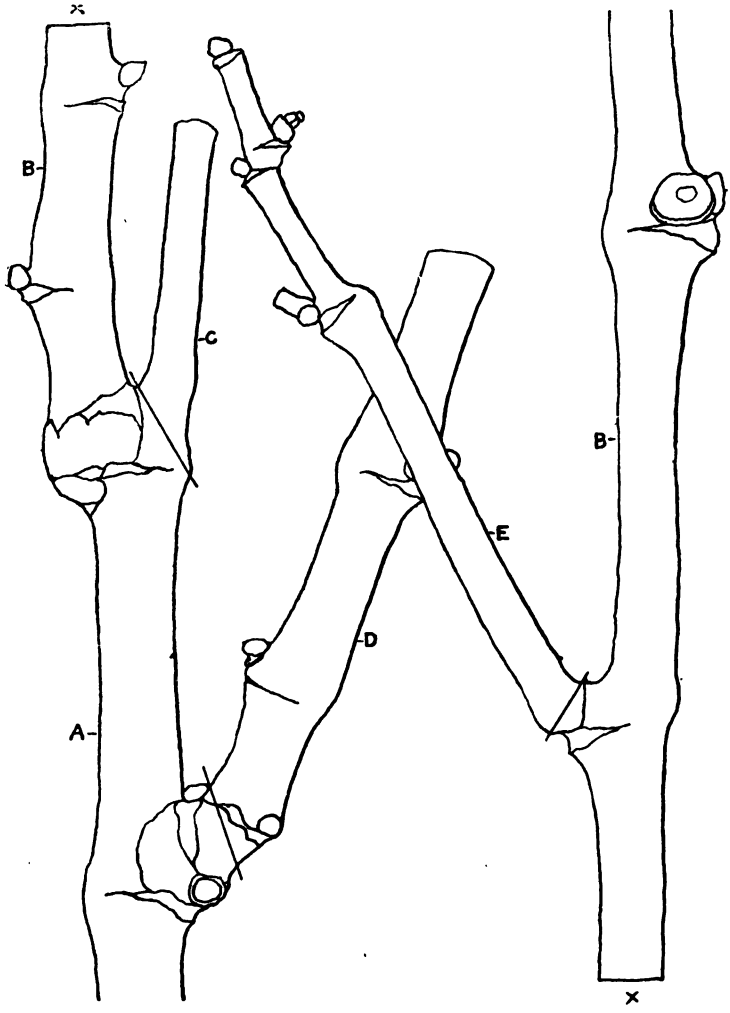

Fig. 13. YOUNG VINE-STEM, SHOWING THE MODE OF PRUNING.

the first pruning; B B is the new wood, the growth of the second year; C is what is termed a "heel," left at the previous pruning, it

being always advisable to cut a little in advance of the eye rather than close to it; D is the first side shoot, and was produced from the second bud left at the previous pruning. This, when pruned off as the cross-line indicates, shows the formation of the first spur, or it may be left to form the second stem where two stems are required; E is a summer lateral shoot, *i.e.*, a side shoot formed from another shoot or stem of the same season's growth; F may be considered as the figurative point to which stem B may be cut back.

To give a practical explanation of our meaning, however, we will suppose the Vine to be cut down, as in fig. 12, to—say six or twelve inches from the ground, and that it was grown well — that is, it has made a leading shoot from fifteen to twenty feet long, and of corresponding thickness. In the first place, if a side shoot like D has been formed, this should be pruned off, as marked, to form the first spur, if it is considered desirable or necessary to have a spur so low. Far better and stronger spurs are, however, produced from the stems formed after being planted out; and this is an additional reason for cutting low down; the stem is stronger and the buds are larger, and so produce better shoots, which form better permanent spurs. In the second place, prune off all summer lateral shoots, such as E, quite close; and then, in the third place, we have to consider the length of the main stem B to be left, or where the point F shall be. This point has chiefly to be determined by the strength of the stem or the vigour of the plant. To the amateur Vine-cultivator it appears a great pity to cut away so much of the fine wood which has been formed; it seems a needless waste first to grow it and then cut it away, when it is known that in every bud there is a bunch of fruit. The temptation is great to leave a good long rod on the young Vine; and so in many cases we may trace the commencement of their "road to ruin."

In the Spur system of training it is of paramount importance that all the permanent spurs should be formed of equal strength. So in the pruning or shortening of the main stem, the point to be kept in view is the power of the Vine to form good shoots from all the buds left. It should be pruned to this point, neither longer nor shorter If we leave a long rod, say of twenty buds, the four or five top buds will break strongly, and the lower portion very weakly, or not at all; and the result will be a Vine stem without shoots, unsightly and unfruitful. Had these been pruned to half the length, all the buds would have broken or put forth shoots of equal strength, regularity, and fruitfulness. It is difficult to define exactly the length of rod to be left. A healthy Vine with a stem, say the thickness of one's thumb or finger, may be allowed some four or five feet of new stem, or even more. It is better, however, to err on the side of severity in pruning the main stems than the reverse. The one is overcome in a few seasons; the other is a permanent loss and disfigurement to the Vine.

Supposing the Vine to have completed its second season's growth, and to be in good order for pruning, if it has grown well there should be some four or five shoots on each side of the main rod or stem left at the previous pruning, with a corresponding continuation of the main stem itself, to ten or twenty feet or more, as may have been allowed. These side-shoots have then to be pruned; by doing this we form the first spurs, and according as we do this, do we lay the foundation of good or bad spurs for the future. It is well, therefore, if only on this account, to give a little care and attention to the matter at the present stage. As already stated, with well-ripened wood there need be little fear of losing a crop of fruit through too close pruning. The bud or eye situate close to the stem, although not so large and conspicuous as the others further off, will produce as strong a shoot as they, and as good a bunch of fruit, or nearly so. Besides, close pruning has the advantage, especially in the present case of first pruning, of keeping the spurs close at home. Fig. 14 may be taken to represent a portion of the main stem of the second season's growth, showing the formation of the first spur. A is a spur properly pruned and formed; B is a spur of far more pretending appearance, such as the timid and uninitiated always leave; it is, however, wrong, and should be cut off, as shown by the cross line, *a b*. Some cultivators recommend leaving long spurs at pruning time, so as to have a choice of buds at disbudding-time, intending then to rub off the front one; but this system is pernicious, as the upper bud is sure to break the stronger, and to allow it to break, and then to rub it off, is a sheer waste of force.

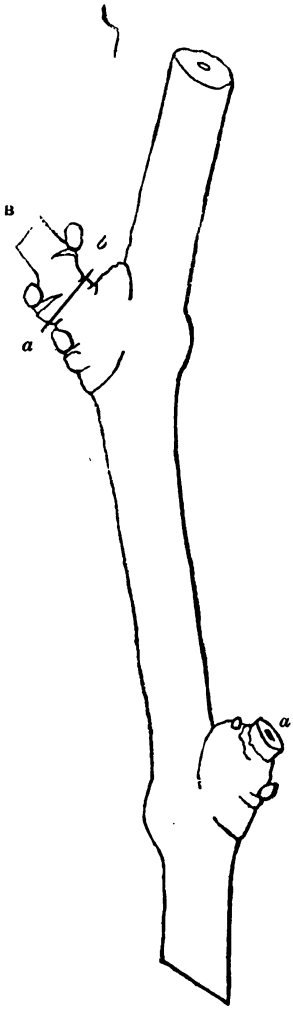

Fig. 14. YOUNG VINE STEM, portion of second season's growth.

As regards the main stem or rod, the same considerations as to its pruning have to be applied as in the previous season. Cut off all the summer lateral shoots; do not depend on any of them for permanent work. Then cut the stem

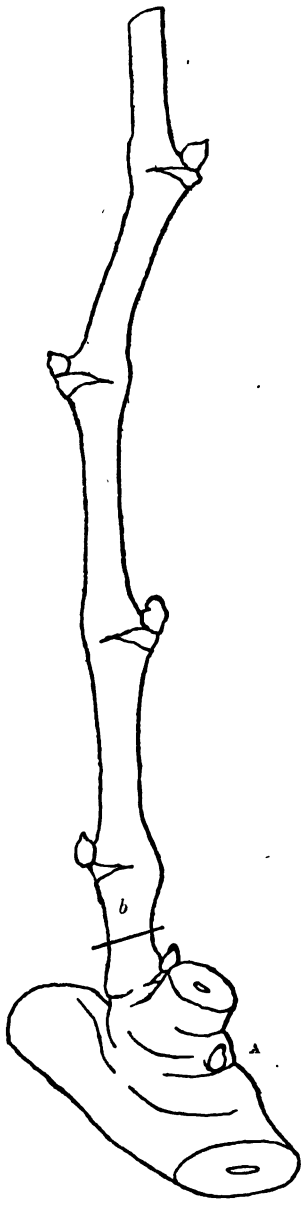

Fig. 15. VINE SHOOT OF THE THIRD SEASON, from properly pruned spur.

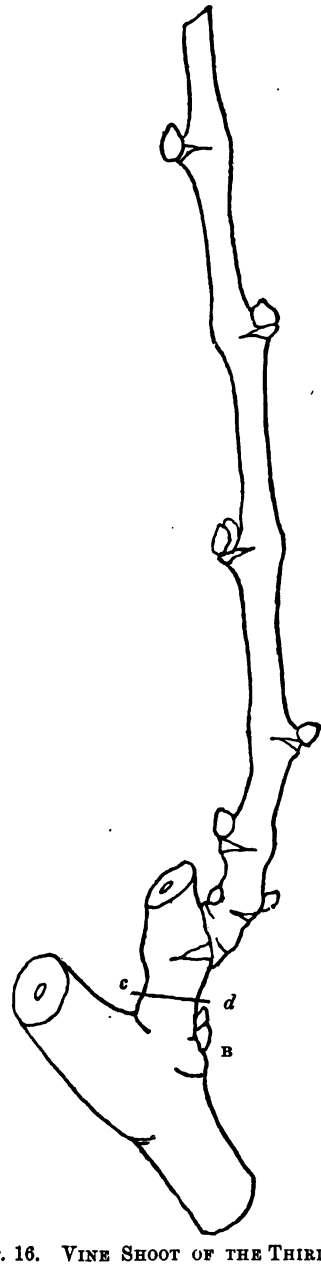

Fig. 16. VINE SHOOT OF THE THIRD SEASON, from improperly pruned spur.

back to, say four or six feet of new wood, according to its strength. A good stem should be about the thickness of one's thumb, and a weak one of the thickness of an ordinary blacklead pencil. If the main stem resembles the latter, it should be cut back quite close, as it would be too weak to produce good side-spurs, or to bear good fruit.

Fig. 15 represents the growth from spur A of fig. 14; and fig. 16 that of the spur B, at the end of the third season. The properly-pruned spur A has produced the properly-placed shoot *b*, which should be pruned the next season, as shown by the cross line; thus forming a close compact spur, which may, subsequently, be pruned for years after in the same manner, with little apparent enlargement. The improperly-pruned spur B of the previous season, it will be observed, has become much worse now. The shoot produced is equal to that of A, but the front bud having been left, the spur has become not only unsightly but permanently weakened. It should have been pruned at the lower cross line, but now that cannot well be done; that is, to continue the proper system of pruning, the cut must be made at the cross line *c d*. This shows clearly to what an indefinite length the spurs pruned in this loose manner would attain in a few years' time. In the course of eight or ten years each spur would be from four to six inches in length; and this on each side of the Vine, which would give twelve inches of wasted space, besides the extra amount of energy annually expended by the plant in producing sap to clothe these long

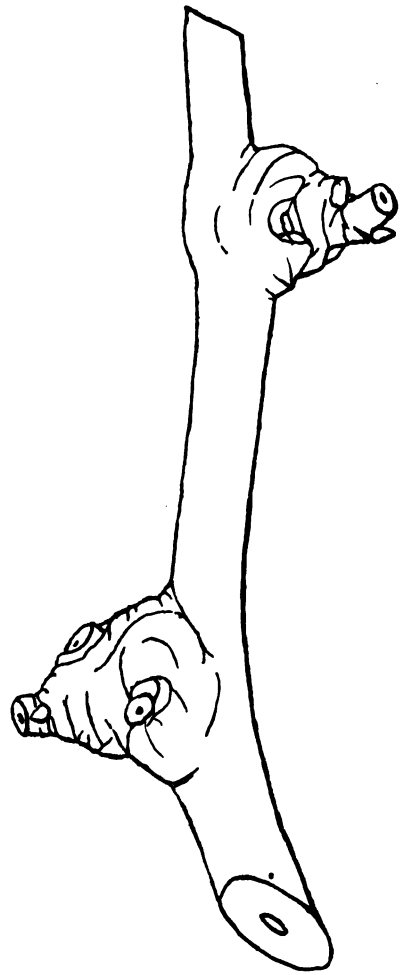

Fig. 17. THREE-YEAR-OLD VINE STEM, (Spur-pruned (reduced).

Fig. 18. TEN-YEAR-OLD VINE STEM, Spur-pruned (much reduced).

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rugged spurs. For the well-being of the Vine, therefore, in an economical point of view, no less than for its neater appearance, it is better to prune so as to have short close spurs.

The condition of the pruned Vine in succeeding years may now be briefly noticed. Fig. 17 may be taken to represent properly-pruned spurs of three years' formation, and fig. 18 similarly well-pruned spurs at the end of ten years. Either may, indeed, by careful and rigid pruning, be kept within very much less compass; but the figures we have given may be taken to represent ordinarily well-formed spurs. The stem of a well-grown Vine at ten years of age should be from one to three inches in diameter, more or less, according to the length of the rod; and a Vine of this age would have for some time attained its full limits as to length, so that the pruning to be practised would be simply a repetition of what has been explained.

One important point, in regard to the spur system of pruning, is that of the distance between the spurs. They are generally retained too closely. This is, in some measure, owing to each bud being allowed to form a shoot, irrespective of its distance from the other shoots. It is necessary to sacrifice some of the shoots in order the better to develop others. The leaves of a Vine are large, so that the side shoots should not be less than from eighteen to twenty-four inches apart. This will allow of a proper leaf development on each particular shoot that may be left. It is only by allowing space and full exposure that the leaves can be properly developed; and assuredly without good leaves there can never be good Grapes.

Long-rod Pruning.—The Long-rod system of pruning the Vine is that which was practised almost exclusively in this country until about fifty years ago, when the spur system was introduced; the latter is so much more simple and so superior that the former is scarcely ever adopted now. Nevertheless, for some varieties of Grapes that bear better on young wood the long-rod system of pruning is decidedly preferable. It may be explained that the method is simply that of training in a number of young rods, and pruning them so that the fruit is borne from the buds on these rods. Very good fruit is thus produced, but the objection to the system always was, and is, its irregularity, and the confusion which occurs in regard to the pruning and stopping of the shoots. Under careless management the bearing rods get all crowded together, and a great quantity of useless wood is produced.

Extension System.—The extension system of training and pruning is simply that of allowing one Vine to grow so as to occupy an extended space; instead of confining it to one stem, many stems are allowed to be formed in course of time. There is much to be said in favour of this system, especially in large lofty houses where Vines require some time to occupy all the space. The development of young rods induces increased vigour, and imparts fresh life and energy to

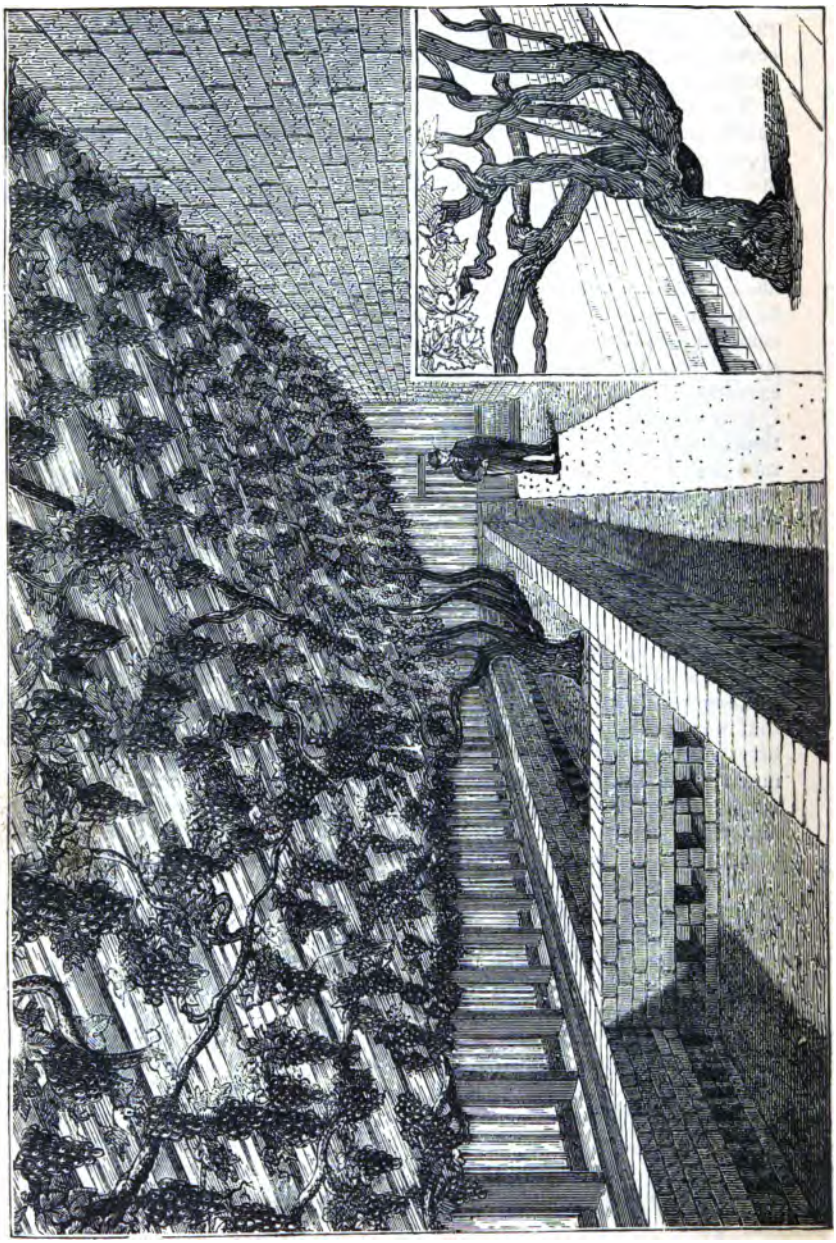

Fig. 19. Portion of Black Hamburgh Vine at Cumberland Lodge. (From the *Gardeners' Chronicle.*)

the plant; and the crop from a Vine so trained is fully greater than that of several Vines occupying a similar space. In the extension system the young rods may be pruned on the spur system, as already described. Some of the best examples of this system are to be seen in the Black Hamburgh Vine at Mr. Kay's, Finchley, which is pruned to five main stems, extending over the entire roof of the house, eighty-nine feet long by eighteen feet wide, which space it filled in six years; the Muscat house at Longleat, eighty feet long, four Vines, one at each corner, filling the entire space; and the great Vine at Cumberland Lodge, Windsor Park.

Another noteworthy specimen of the extension system is the Black Hamburgh Vine at Manresa House, Roehampton. This was raised from a cutting by the present gardener, Mr. M. Davis, and planted against a wall in the garden thirty-one years ago, for supplying leaves for garnishing. It grew well, and one of its rods was taken under a walk into a neighbouring house. The Vine has now seven rods, trained as straight as lines, horizontally, about two feet apart, under the sharply pitched lean-to roof. They are disbudded on the under side, shoots being taken at intervals of about a foot from the upper side only, occupying the space to the next rod. The Vine fills a house two hundred and twenty-four feet long, and the aggregate length of the rods is one thousand three hundred and sixty-five feet, or upwards of a quarter of a mile; the Grapes hanging in long, straight lines, with the regularity of bottled Grapes on racks in a fruit room, have an imposing appearance. The bunches average from one pound to three pounds in weight, and the berries are large and well finished. One season, eight hundred bunches were cut and sold for £107. This Vine is in perfect health, is the pride of the place, and a credit to its manager.

The Vine being diffuse and somewhat rambling in its growth, there can be no doubt that the principle of extension is more consonant with its natural habit than that of repression, of which the spur system is an extreme development. Extension is assuredly favourable to longevity, whereas the opposite treatment more rapidly uses up the energies of the plant. The more a Vine is allowed to grow the greater amount of vital force it secures; were it not that the Vine is an exceedingly good-tempered subject, and quickly recuperative, this result would become more generally apparent than it now is. Rich feeding, with restricted growth, will lead to the production of heavy crops of fine fruit, but it is a high pressure system of management, and it is seldom long before Vines break down under it, and lapse into a condition of mediocrity.

CHAPTER X.

DISBUDDING AND STOPPING THE SHOOTS.

ON the commencement of the growth of the Vine, each succeeding season, the first operation that requires to be performed, and to which attention must be at once directed, is that which is termed disbudding, but which is, in reality, a thinning-out and regulating of the young shoots that have appeared This is an operation of very great importance in respect to young Vines, as upon its being properly carried out will depend their future form or character. Disbudding is, in fact, the first step in training, although it is practised much in the same manner long after the form of the Vine is established. Improper disbudding will counteract the best system of pruning that may be adopted; therefore it should be performed carefully and judiciously. The time for disbudding is just as soon as it may be perceived that there are more buds than are requisite —say, when the shoots are an inch or thereabouts in length; but the sooner it is done the better. To allow the superfluous buds to develop into shoots, and then to break them off, is a clear waste of the energies of the Vine. Some cultivators wait until it can be seen where the clusters will be produced before disbudding finally, and this is safe practice with some varieties of Grapes.

In disbudding a young Vine, or a leading shoot of the previous year's growth, the first care should be for the top or leading bud, the growth from which should be carefully tied in and preserved from injury, as forming a continuation of the main stem. In the disbudding of a young Vine, we also regulate the number of shoots which form the future spurs, as explained in the previous chapter. To allow space for the full development of the foliage, these side-shoots should not be less than eighteen or twenty inches apart on each side of the stem. It frequently happens, especially in the case of slowly-grown Vines, that the buds on the stem are more numerous than the shoots required, and in such cases, all those not required must be removed—rubbed off, as the phrase is. Nothing is more pernicious in Vine culture than the crowding of the shoots and leaves. It is well, therefore, to make a fair beginning with the proper number, and this is done by disbudding. Careless disbudding, or rubbing off the wrong buds, that is, the buds that should be retained, which is easily done, must be guarded against. The loss of a bud often means the entire loss of the shoot or spur, and is the source of permanent disfigurement to the Vine.

Disbudding, also, at times, takes the place of pruning. If the lower buds of a young Vine-rod do not break well, it is a good plan to rub

off the higher or top buds, which will induce the lower ones to break stronger. Again, if it has been forgotten to prune a Vine or shoot until it has become too late to do so on account of the risk of bleeding, the neglect may, to some extent, be rectified by a careful rubbing off of the buds, as soon as they may appear, back to the point where the shoot ought to have been pruned to; and then, when the leaves are about fully developed, the sap of the Vine will be sufficiently diverted, and the shoot may be pruned with safety.

Following closely on the operation of disbudding comes that of tying-down and stopping the shoots. The young shoots of a Vine, especially when they are growing vigorously, are exceedingly tender and easily broken, so that the work of tying them down into their proper position on the wires or trellis to which the Vines are trained —for they naturally grow upwards towards the glass—requires a great amount of care and patience When they are found to be at all brittle, they must only be inclined or drawn down a little at one time, and so gradually bent or guided into the right position. Practically, however, it is not advisable to tie the shoots very early; if the leaves are allowed to expand a little, and the shoots to get some of their woody fibre developed, they will be found to bend pretty freely into the desired form without breaking.

In reference to stopping the shoots, our illustration, fig. 20, shows the upper portion of a young Vine-shoot, with its bunch of flowers, which is eventually to become a cluster of berries, as it would appear at this stage. The stopping is requisite in order to keep the growth within certain limits, and thus to prevent overcrowding and a confusion of the shoots. According to the spur system, the main stems being from four to five feet apart, the side-shoots, on which the fruit is borne, cannot be allowed to extend to more than two and a half feet in length, otherwise they must overlap each other. But often in fact, the length of the shoots has to be regulated by the position of the bunch. The usual practice is to stop them at two joints beyond the bunch, as shown at *a* in our figure, or at one joint beyond, *b*, if there is not space for a greater extension. Practically, the longer these shoots can be allowed to grow without stopping the better, as the greater the quantity of fully-developed first leaves, the greater the amount of vigour induced. The operation itself should be performed as soon as the shoot attains the requisite length, and is done simply by pinching off the tip, at the point indicated, fig. 20*a*, between the finger and thumb, before it has become fully developed. There is thus nothing, or scarcely anything, to take off, no denuding of the Vine of a portion of its foliage, and no consequent check to its growth. It is a very bad practice indeed to allow the shoots to grow to such a length as to render it necessary to use the knife in stopping them. This is a great waste of the Vine's resources. The tendril forming a part of the bunch of fruit should be pinched off at the same

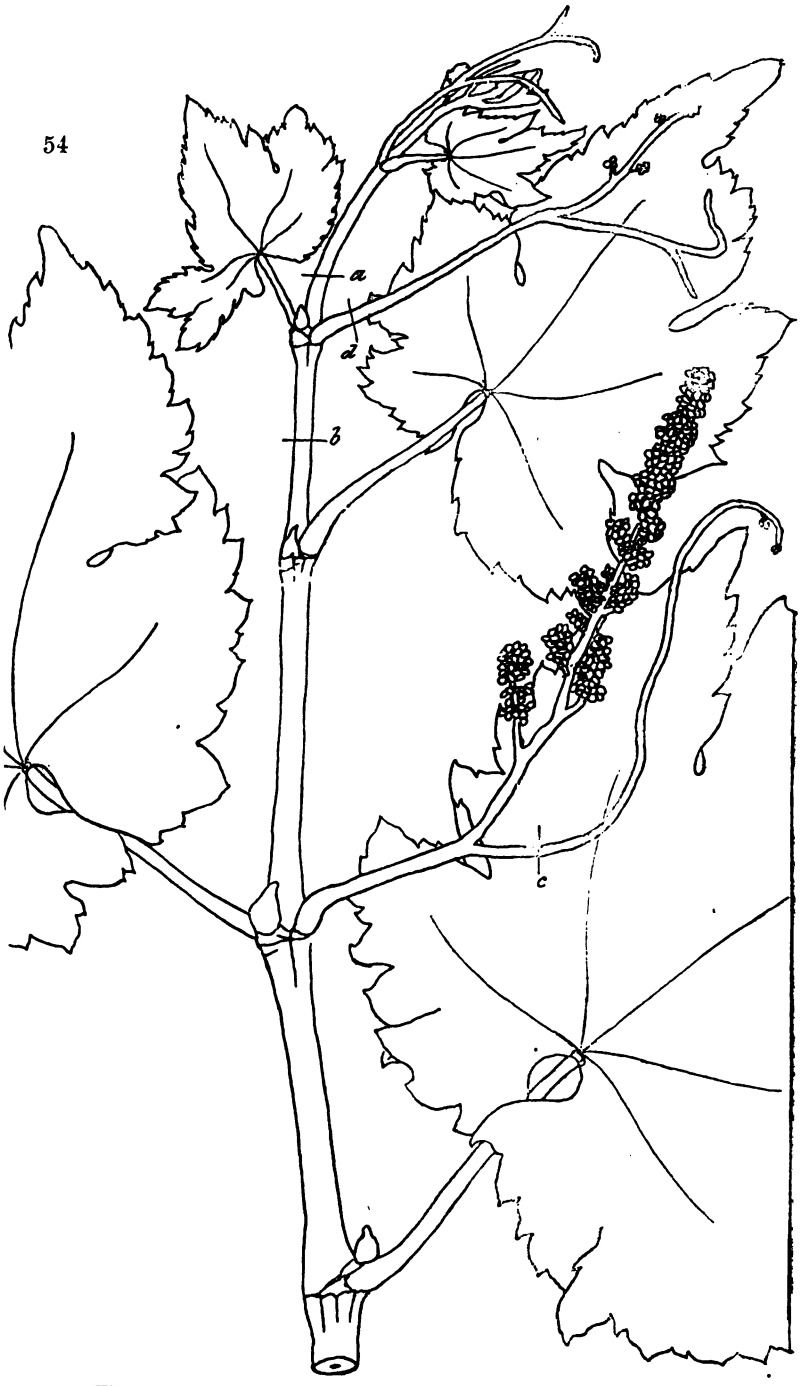

Fig. 20. YOUNG SHOOT OF VINE, showing the mode of stopping.

time as shown in fig. 20 at *c*, as also should the bunch or tendril, *d*, found opposite the first or second leaf above the proper bunch.

After this first pinching or stopping, the foremost buds seen in the axils of the leaves again produce shoots, according to their vigour, as shown in fig. 21. These second shoots are called laterals, or summer lateral shoots, as shown in chap. ix., fig, 13, E. They should be stopped in the same way immediately beyond the first leaf, as at fig. 21*a*, and so on again and again throughout the season, as they may continue to grow.

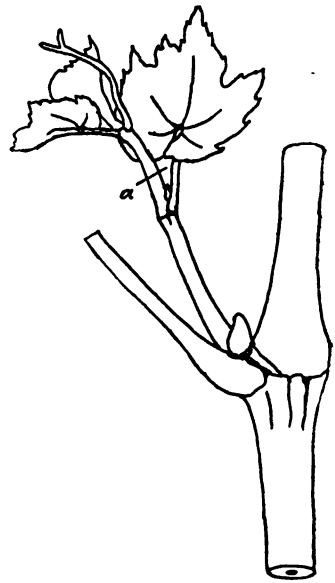

Fig. 21. LATERAL SHOOT OF VINE, showing the mode of stopping.

The leading shoot of a young Vine is, of course, to be exempted from this stopping, excepting in so far as relates to the laterals it produces; and these, if space is limited, must be stopped in the manner just explained, or they may be trained out in the same manner as the proper shoots, and allowed to extend and occupy as much space as may be available. It should always be borne in mind, that the greater the quantity of fully-developed leaves and shoots, the more powerful must be the root action and the more vigorous the plant. The stopping of the shoots of a Vine is not a checking or repressing of its vigour, but rather a guiding or directing of its energies into certain channels of a more desirable and beneficial character than those they would follow if left to themselves.

Care must be taken that at the commencement of the colouring period the shoots are all kept properly stopped. At this period the greatest caution is necessary that no check should be sustained by the respiratory organs of the Vine, which a sudden stripping of the leaves might cause, with the probable result of inducing shanking or some other evil. If, through neglect, the shoots may have grown somewhat long and become confused, it is better to leave them so until the fruit is coloured and ripe, and the critical period is past, than to remove a great number at one time.

CHAPTER XI.

THE SETTING OF THE FRUIT.

THE flowering period and that of the setting of the fruit are anxious times to most cultivators of the Vine, especially in the case of early forcing, so much being dependent upon the state of the weather, and consequently upon the careful management of the temperature and the atmosphere of the house. Vines in good robust health set their fruit, in a general way, quite freely under the proper conditions, but sickly ones do not, and the more sickly they are the less satisfactory is the setting.

By the setting of the fruit is meant the proper fertilization of the ovary. If the flowers are not properly fertilized they will probably fall off; or, perhaps, small berries may be formed, but as no seed can be produced by reason of non-fertilization, they, as a consequence, will not grow to their proper size. The fertilizing process, in a mechanical point of view, consists of the application of the pollen to the stigma, or point of the style or pistil of the flower. It is effected at a very early stage, the little jerk occasioned by the dislodgment of the "cap" or covering causing the pollen-dust to be dispersed. This is generally effected naturally, or without any assistance beyond the maintenance of the proper temperature, atmospheric conditions, etc., and these, of course, vary according to circumstances, which will be noticed more fully hereafter.

Some cultivators consider it absolutely necessary to maintain continuously a very high temperature—from 65° to 70° by night—for the setting of their Grapes. This may be desirable for the forcing-on of the Grapes, but it is not really required for the mere "setting" of the fruit. For example, in late houses, and on the open walls, the Vines set their fruit quite freely at a much lower temperature; we have frequently seen it below 45° at night, and yet the Grapes have set well. It is, therefore, fair to assume that a temperature ranging from 55° to 60° by night is quite high enough for the mere purpose of setting the fruit, provided there is the desired rise in the temperature during the day. Be it noted that the setting process takes place in the early morning and forenoon. The temperature by day should always be high by sun-heat. If there is proper ventilation, the cultivator should have no fear of a high sun-temperature. The one great requirement is sunshine—only not too suddenly bright after dull weather—with a fine mild bracing atmosphere, so that fresh air in abundance may be admitted to the houses. It is the fine bracing air when supplemented by the action of sun-heat which induces the dispersion of the pollen, and by this means effects the setting of the berries.

At times, when sunshine is wanting, or when it is felt that extra care is required, it is well to apply artificial assistance, such as "setting" the flowers with a camel-hair pencil. The smallest portion of pollen applied to the stigma will be sufficient; or the plan of smartly tapping the stems of the Vines, so as to shake the bunches, may be adopted, when the pollen will be seen to fly off like a cloud of dust: or, again, recourse may be had by drawing the hand gently over the bunch. This plan is frequently practised with success amongst the more "shy setters."

Certain varieties of Grapes, it is well known, set their fruit freely at all times, and under all sorts of conditions that may be favourable for the Vine. Other varieties do not set freely, whatever may be the reason, and are, in consequence, termed "bad setters." Many and varied conjectures and ideas have been submitted from time to time as to the probable cause of this defect. In practice cultivators overcome the defect by artificially impregnating the flowers, either with pollen from the same or of some other variety. For the setting of Muscats a somewhat high temperature and dry atmosphere are considered beneficial, yet others have been equally successful in following the opposite practice—low temperature and syringing the bunches when in flower. Scientists have pointed out that the pollen and the stigma in some varieties do not ripen at the same time, so that fertilization cannot take place, and the action of foreign pollen becomes necessary. In some cases the pollen is found to be inert; stress has also been laid on the peculiarity of some sorts—having the point of the stigma exceedingly moist, notably Black Morocco, and so preventing fertilization, a condition generally supposed to be favourable for the reception of the pollen.

Herr Stefan Molnár, Director of the School of Vine culture at Buda-Pesth, has observed that the "free-setting" varieties of Grapes have the stamens erect, forming a cluster round the stigma; whilst the "bad-setting" varieties have the stamens deflexed or falling away from the pistil, so that the pollen does not so readily reach the stigmas. Dr. Engelmann has also observed the same peculiarity, and states that "the fertile plants are of two kinds—some are perfect hermaphrodites with long and straight stamens, the others bear smaller stamens, shorter than the pistil, which soon bend downwards and curve under it; these may be called imperfect hermaphrodites and do not seem to be as fruitful as the perfect hermaphrodites unless fertilized."

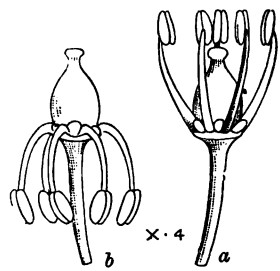

Fig. 22. Flowers of the Grape Vine showing position of stamens, *a*, erect, free setting; *b*, deflexed, shy setting.

Fig. 22*a* is an illustration of the perfect hermaphrodite flower as in

the Black Hamburgh, Gros Colman, Royal Muscadine, etc. These would appear to set freely from the stamens forming a cluster round

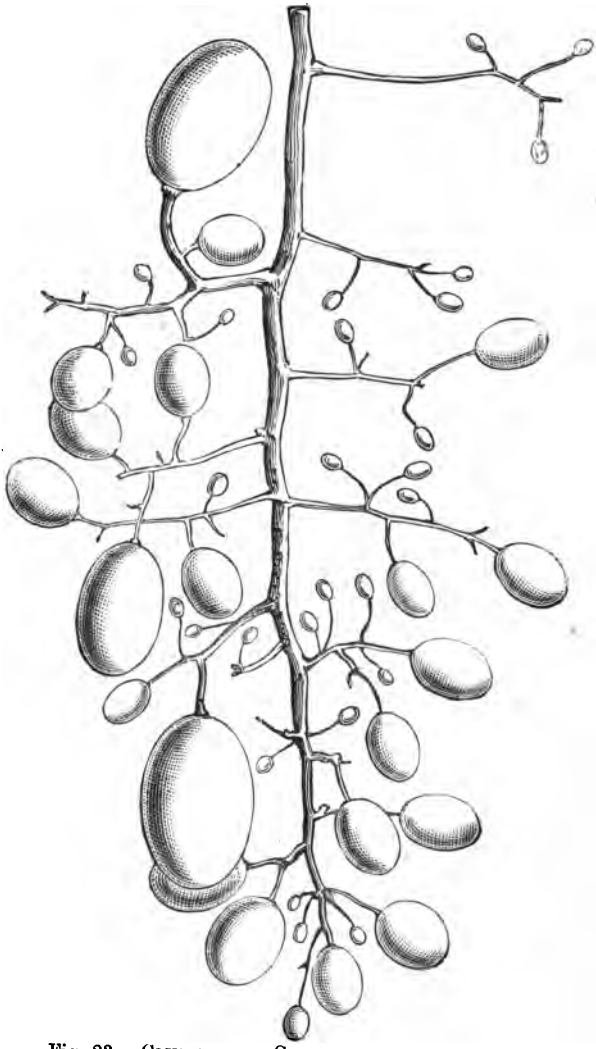

Fig. 23. CLUSTER OF GRAPES IMPERFECTLY SET.

the top of the stigma, on which, when the cap is dislodged, the pollen immediately falls, and impregnation is effected.

Fig. 22*b* represents the "imperfect hermaphrodite" flower which we have observed in the following varieties:— Alnwick Seedling, Black Morocco, Chaouch, Diamant Traube, Eldorado, Lady. These varieties do not, as a fact, set freely; and this is, probably, owing to the deflexed stamens not being near enough to the stigma for it to receive the pollen, these apparently not being affected by the jerk in the dislodgement of the cap to so great an extent as the others.

It would thus appear that the defect of setting in some instances is a structural or constitutional peculiarity, not influenced to any great extent by the cultivator's skill. Artificial impregnation is the only legitimate remedy or practice to follow.

The illustration here given, fig. 23, is that of a small bunch of the Black Morocco, in which it will be seen that only two or three berries have been properly set, and have continued to grow; the small berries never growing larger, although they ripen, and are very sweet, in this respect exactly resembling those varieties which are termed "stoneless" Grapes, such as the Black Monukka, Corinth, Sultana, etc., which rarely produce any perfect berries, although they have erect stamens.

CHAPTER XII.

THINNING THE FRUIT.

THIS is an operation of considerable importance, not only for the well-being of the crop of fruit, but also for the after or lasting well-being of the plant itself. The Vine is extremely fruitful, so much so, that were the whole crop of the bunches produced by it allowed to remain, the plant would soon succumb through over-fertility. It is easily possible to over-crop a Vine, and where such has been the case, it will take years for it to regain its former strength. It is quite impossible to form any estimate as to how many bunches, or what crop a Vine should carry, so much depends upon its health and constitution, on its surroundings, and on the subsequent management accorded it. A very good rule to follow would be this: according to the surface of properly developed leaves, etc., so should be the crop of fruit taken. We know we must have so many good leaves for every pound of fruit, and the greater the amount of properly developed foliage allowed the better. If we bear in mind that all the colouring and sweetening matter which goes to the perfecting of the berries has first to pass through and be elaborated by the leaves, it will be seen that without a certain amount of healthy leaf-surface good fruit cannot be produced. A Vine with weak sickly foliage cannot produce or bear much fruit, and a Vine whose foliage gets destroyed by red-spider, etc., is in exactly the same condition.

As a general rule, one bunch on each spur would be considered a heavy crop. If one third of these bunches were taken off, the bunches being of moderate size, what is left would be a moderate crop, say an average of one pound to every foot of rod. In thinning the bunches of such free-setting varieties as the Black Hamburgh, every second bunch on each spur should be cut off before the flowers open, and all others which it is desirable to remove as soon as the Grapes are set. The thinning of the bunches as well as of the berries should take place as early as possible. It is a great waste of power to allow that to develop itself which is not required, and which it is known must be cut away; therefore, as soon as the berries are fairly set, thin out—that is, cut off—the supernumerary bunches at once, and commence the thinning of the berries.

The thinning of the berries, or Grape-thinning as it is popularly called, is a delicate and somewhat tedious operation. To be expert at this work requires not only considerable practice, but a quick eye to

see where and what to cut, and a nimble yet steady hand, so that the berries retained may not be injured. Fig. 24 represents a small bunch of the Black Hamburgh unthinned, and fig. 25 one of similar size

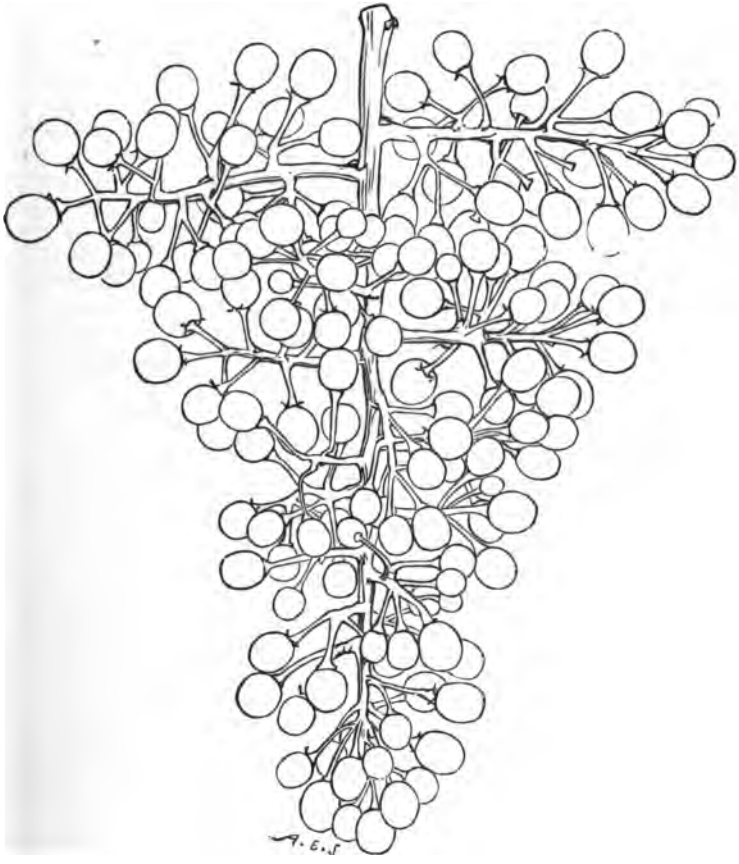

Fig. 24. SMALL CLUSTER OF GRAPES BEFORE THINNING.

after being properly thinned. In the former example there were one hundred and thirty-two berries, and in the second there were, before they were cut out, one-hundred and twenty-four berries, but these have been reduced by the scissors to sixty-four—about one-half. This may be taken as a fair average of the thinning required for ordinary well set Black Hamburgh Grapes. Of course, the number retained should

vary according to the size of the berries of each sort; such varieties as the Royal Muscadine do not require to be so severely treated. It seems to the uninitiated a great sacrifice to cut away so many, the

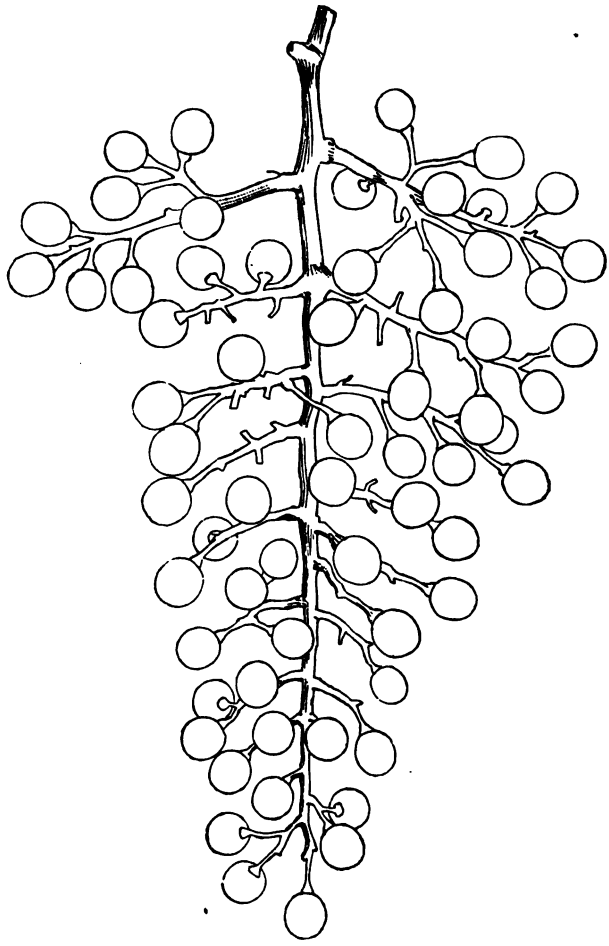

Fig. 25. SMALL CLUSTER OF GRAPES AFTER THINNING.

thinned bunch appearing quite a skeleton; but when it is remembered that each berry, when fully grown, should be nearly one inch in diameter (oftentimes more), it is plain that to leave more than there

is actual space for is absurd, as well as injurious. With some close-clustered varieties, such as Black Alicante, it is often desirable to commence the thinning process before the flowers open.

The mechanical operation of thinning Grapes is thus performed :— Procure a little cleft or forked stick about six inches long to use with the left hand, in order to hold the bunch firmly without touching it, and take a pair of Grape-scissors in the right hand. Trim the bunch if required into proper shape first, then continue by cutting out all the inner berries, next all the small berries, and then the side berries. The expert hand will cut these off two or three or more at a time, not singly, as the hesitating, unpractised hand will do. This, it will be found, will have materially lessened the work, and it will only remain to regulate the remainder to the required distance apart.

The time that is occupied in thinning Grapes is very great, but it must be given to the operation if good Grapes are desired. It will take about five minutes for an expert hand to thin properly a one pound bunch. With larger bunches it is frequently desirable to tie the shoulders up, and so spread the bunch out, or loop them up to the trellis with S-shaped pieces of thin wire of the requisite length ; others prop the shoulders up from underneath with bits of wood ; but for ordinary cultivators not any of these aids are required ; the berries as they swell lift each other up, and the clusters thus remain compact. Care should be taken not to make the bunches too thin ; loose spreading bunches are objectionable and easily damaged. They should be so thinned, that when ripe and cut the bunch or cluster may remain firm and compact, whilst every berry has been allowed to develop itself freely to its full size.

Very expert hands may be able to thin a bunch properly at one operation—small bunches may easily be so ; but, as a general rule, they require to be gone over twice before the stoning period, and once after, during what is termed the "second swelling," in order to remove all small berries, and otherwise regulate the bunches.

In the great Grape-growing establishments the greater part of this work is performed by women and young persons, who are nimble with their fingers.

CHAPTER XIII.

KEEPING THE FRUIT.

GRAPES, unlike most other kinds of fruit, will keep in a ripened state, and in a usable condition, on the plant; a certain amount of nourishment or sustentation being necessary to the maintenance of the berries in a properly fresh and plump condition. Grapes, although ripe, soon shrivel or decay if dissevered from the Vine, excepting sustenance is provided in some way; properly ripened, and placed under favourable conditions, they will keep in excellent condition for a long time. The better they are ripened, the better they will keep. Some varieties, however, possess this keeping property to a far greater extent than others. The fact of being thus able to keep ripe Grapes, prolongs the season of their use, and greatly assists in maintaining a continuous supply.

The cultivation of the Vine in glass-houses is the primary means by which we are enabled thus to keep its fruit. Grapes grown in the open air cannot be kept for any length of time on account of the weather, but under glass they are under control. Vineries, therefore, that are required for late or keeping Grapes should be so constructed as to meet the special requirements of the case; these are the maintenance of an equable temperature and a dry atmosphere, which are secured by proper heating powers, and thorough ventilation.

All Grapes that are required for late use should be ripened by the end of September. Grapes that have to be ripened after this period do not keep so well. The Gros Colman is an exception to this rule; the later they are, the better they keep. Although when the fruit becomes ripe the most active period of the growth of the Vine is past, it is not well, although it is a very old custom, to keep the borders and the roots dry. The artificial drought is injurious to the roots, which are still in action, and not beneficial to the fruit, for the longer the foliage can be maintained fresh and green, the better the Grapes will keep. Mr. William Taylor, of Longleat, now of Bath, does not hesitate to water his inside borders on wet days, whilst the Vines are laden with ripe fruit; he has no fear of damp or mould arising in that way, and he is right. His trust is in thorough ventilation by day and by night, and the maintenance by fire heat of an equable temperature, ranging as near 45° as may be possible. Constant daily supervision is necessary, and great care should be taken to remove any decaying berries.

Ripe Grapes may be kept in good condition on the Vines until March and April, or until the rise of the sap; but if allowed to hang

to so late a period, the operation of pruning may prove injurious to the Vines. All fruit should, if possible, be removed from the Vines, so that they may be pruned by the end of January.

Bottling Grapes.—Grapes may be cut from the Vines, and having their stalks placed in bottles of water, may be kept in a fruit room or other suitable apartment in almost as perfect a condition as those that are allowed to hang on the Vines; and where the quantity is limited, this can be done at a very much less expense. Further, they may thus be kept to a later period than it is possible to keep them on the Vines. This is a method of keeping Grapes that has been for some time adopted in France, although scarcely known in this country until brought under notice by Mr. Robinson, in his *Parks, Promenades and Gardens of Paris*, in 1869. It is now, however, adopted, with modifications, in many establishments in this country.

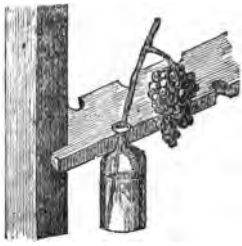

Fig. 26. RAIL USED IN FIXING THE BOTTLES FOR GRAPES AT THOMERY.
From *Parks and Gardens of Paris.*

The originator of the system was M. Rose-Charmeux, of Thomery, who had a small room in his house fitted for the purpose, fig. 27, from which light and air were, as far as possible, excluded. Fig. 26 shows the rail used for fixing the bottles.

One of the best examples of this method is that used at Ferrières, near Paris, the seat of Baron Alphonse de Rothschild, where M. Bergmann, the excellent gardener, has a Grape room specially fitted for the purpose, and in this all the Grapes are placed as they become ripe. Fig. 28 A is an illustration of the mode of fixing the bottles as there adopted, and fig. 28 B shows the arrangement of screens or partitions adopted within the room for the convenient stowage of the bottles when in use.

The ordinary fruit room will not answer for this purpose; the Grapes cannot be kept with other fruits, but require special provision to be made for them. A thoroughly dry, close, dark room is what is required—a room wherein an equable temperature of 40° to 45° may be maintained. Dryness is the first consideration, so if a separate room has to be constructed, it should be built with hollow walls and a double set of doors, in order to counteract the effects of fluctuations in temperature and moisture. It should be heated, also, so that it may be practicable to drive out damp when necessary, although much fire heat is not required, for when once the Grapes are placed in the room, the less frequently it is opened the better, as the admission of damp cold air is to be avoided.

The Grapes intended to be thus kept ought to be quite ripe, and should be cut with a considerable portion of the shoot attached. The

end of this shoot is then placed in a bottle filled with pure water; no charcoal is necessary to keep it pure, nor does it matter

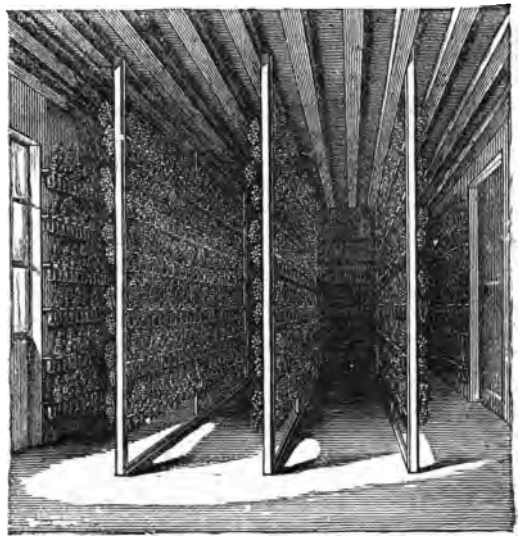

Fig. 27. INTERIOR OF GRAPE ROOM AT THOMERY.
(From Robinson's *Parks and Gardens of Paris.*)

much which end of the shoot is placed in the water. The bottles, when thus filled, are to be placed on the rack, as shown in the illustrations, the fruit hanging clear and not touching anything. If

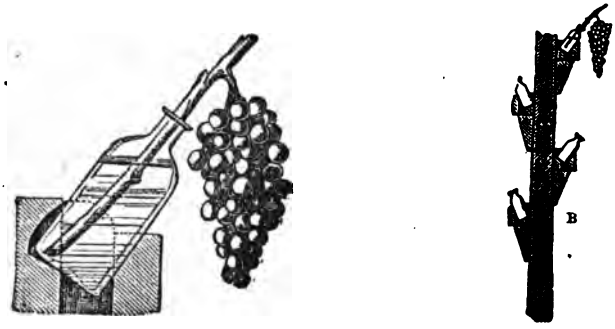

Fig. 28 A. MODE OF FIXING THE BOTTLES FOR GRAPES USED AT FERRIÈRES.
B. SECTION OR PORTION OF UPRIGHT FOR SUPPORTING THE BOTTLE-RACKS.
(From *Parks and Gardens of Paris.*)

the room is dry and suitable, certain sorts of Grapes will keep in plump condition until the month of May, and even later.

Fig. 29 shows, in section, one side of the Grape-room at Heckfield, and indicates the arrangement of the Grape-bottles in three tiers of racks running horizontally round the room.

In the excellent fruit-room at Combe Abbey, Coventry, Mr. Miller has fitted up a case like an ordinary book-case, with glass doors, in which the Grapes are kept in bottles in very good condition.

Opinions differ as to whether the fruit is deteriorated in quality by being thus kept. It is obvious that support is derived from the water, and this subsequent absorption of water can scarcely act otherwise than to reduce the amount of saccharine properties in the fruit. Mr. Thomson, in *The Florist and Pomologist*, records an instance of an invalid lady being made ill by eating "bottled Grapes," while fresh-cut fruit, on the contrary, proved to be invigorating.

The best late-keeping Grapes are those varieties having thick skins, viz., Gros Colman, Lady Downe's Seedling, Alnwick Seedling, West's St. Peter's, Gros Guillaume, Trebbiano, White Tokay, and Muscat of Alexandria. It is difficult to keep Black Hamburgh Grapes in good condition on the Vines after Christmas; but if cut before that time, and placed in bottles, they may be had in a sound state during the month of January or later.

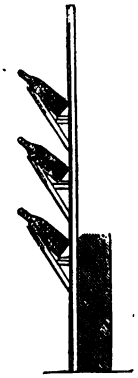

Fig. 29. SECTION SHOWING SIDE OF GRAPE-ROOM AT HECKFIELD WITH THE MODE OF ARRANGING AND FIXING THE BOTTLES. (From *Parks and Gardens of Paris.*)

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CHAPTER XIV.

PACKING GRAPES FOR PRIVATE USE AND CONSUMPTION.

THE packing of fruit which has to be sent away is a matter of considerable importance, and is deserving of a greater amount of care and attention than is generally given to it. A very great quantity of good fruit is spoiled, absolutely spoiled, by careless packing. The knowledge, therefore, how to pack for transit, so that the least possible injury may be caused to the fruit, is of great value.

In packing Grapes, a natural desire is always felt to preserve the bloom, and a fear is always present with the inexperienced that they are packing too tightly. It may be observed that Grapes cannot be packed at all without a certain amount of rubbing and destruction of the bloom, but if the work be carefully and promptly performed it will not amount to much. In the case of properly packed Grapes, all the rubbing and damage occurs during the operation of packing, whilst in that of careless packing the damage is sustained during transit.

The great art of packing Grapes, or, indeed, any fruit, is to pack *firmly*, so that they cannot shift or move about. Boxes are preferable to baskets, as they do not so readily yield to pressure. In packing certain quantities, it is better to make the box of a size to hold the quantity required, and to fill it. The depth of the box should be according to the depth and breadth of the bunches, but need never exceed five inches. The method we have always adopted here—and Grapes have been sent with safety from Chiswick to all parts of the world—is to place a thick layer of cotton-wool, or of short, dry, specially prepared grass, at the bottom of the box; several sheets of thin paper are then placed over this, and the box is also lined with paper, one half of the top sheets being allowed to hang over, for the purpose of being folded over the Grapes when the box is filled. The bunches on being cut are laid in the box, beginning at one end, placing them with the stalks upwards, as closely together as they can be, and keeping them well up to the top or rather above the top of the box to allow for settling. The larger the box the greater the care required. When the box seems full, a slight shaking whilst holding it a little on one side will cause the bunches to settle down still closer, when another bunch or two can be added, or the space filled up with cotton-wool. After filling the box the paper is folded over the top of the Grapes, and all the hollow places between the paper and the side of the box filled with packing material. If the Grapes quite fill the box after shaking, nothing is placed on the top besides the paper; if somewhat flat a sheet or two of cotton-wool is placed

over the paper, and the lid is screwed or nailed down. Cotton-wool is never used next to the Grapes, excepting occasionally to support a heavy shoulder.

A new material named "wood-wool" has lately come into use for packing purposes, and is found to answer admirably for Grapes. It is used in the same way as cotton-wool, which it is likely to displace, having much more buoyancy and elasticity. "Wood-wool" is the fine hair-like shavings of wood prepared for the purpose, the best being that of willow or poplar. That made from deal is apt, if kept in a warm place, to impart a taste of the resin.

For several years Messrs. Webber & Co., Covent Garden, offered prizes at the meetings of the Royal Horticultural Society for the best mode of packing fruit to be sent long distances. The most successful competitor, Mr. Coleman, gardener at Eastnor Castle, practised much the same method of packing as we have here described, but used dry moss in preference to any other packing material. There is a certain elasticity about moss that renders it specially suitable for the purpose, and where it can be procured it is well to use it. It is superior to cotton-wool, which has very little elasticity. Mr. Coleman's method of packing fruit is very lucidly described in the *Gardeners' Chronicle*, N.S. xii., 624. His instructions in respect to packing Muscats, which are very easily bruised and discoloured, as well as for packing large bunches, are particularly good; not only does he line the bottom of the box with dry moss, but "the sides and ends are lined with long strips of wadding, folded in silver paper," and the bunches being laid in sheets of paper, are divided from each other by strips of wadding and packed firmly. The wadding or cotton-wool must not, on any account, be placed in direct contact with the fruit.

Another method is to wrap each bunch separately in thin paper, and then pack with cotton-wool or moss, or sometimes bran, but as these methods cannot be recommended it is unnecessary to notice them further.

White Chasselas and White Lisbon Grapes, as sold by grocers, are termed dry fruit, and are not included as Grapes proper; these are received packed loosely in large casks or barrels, which are then filled with bran or cork dust. In this way they arrive in wonderfully fresh condition. When unpacked the bran has to be brushed off before they can be sold or used. For the packing of Grapes for market, see chap. xxii.

Packing Grapes for Exhibition.—When required for exhibition, Grapes have to be submitted in the most perfect condition possible, showing as little as may be of rubbing or the displacement of the bloom. They cannot, therefore, be packed or sent in any ordinary way. No matter how securely the bunches may be fastened, and how legibly the boxes may be labelled "Grapes with Care," "This side up," if consigned to the ordinary means of transit they are invariably

smashed or damaged. The preservation of the bloom forbids the use of packing material—indeed, nothing must touch the Grapes, and yet they must be fastened securely enough to be carried safely; they must, in fact, be taken to the exhibition and staged under special personal supervision.

The ordinary plan is to fix the bunches by the stalk with wire to a board or stand, previously covered with white paper, and placed in a sloping position. When the bunches are long or large, one or two more ties are required to prevent their moving, and the loose shoulders are propped up with wads of cotton-wool. This board or stand, with bunches affixed, is then placed in a suitably prepared box, and screwed down. Great care must be taken to have it carried in the same position to its destination.

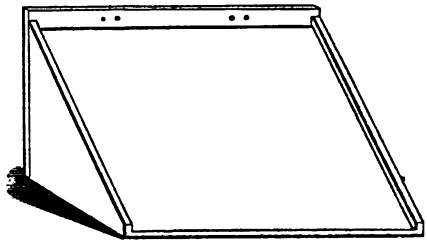

Fig. 30. EXHIBITION GRAPE STAND.

Practised exhibitors have specially prepared stands and boxes, which show off the Grapes to great advantage, and in which they can also be carried with great safety. The illustration here given, fig. 30, is that of a stand for two bunches from 12 to 15 inches in length, the same as used by Mr. Taylor, gardener to Alderman Chaffin, of Bath, which is one of the best we have seen.

CHAPTER XV.

THE POT-CULTURE OF VINES.

THE cultivation of Vines in pots does not seem to have been practised to any extent until about fifty or sixty years ago, as we read in *The Transactions of the Horticultural Society* of "Pot Vines bearing fruit one year old" being exhibited in London in 1818, which were looked upon as quite wonderful. During the last twenty-five years, however, the cultivation of Vines in pots has been carried on to an extraordinary extent. In some gardens they are used for very early forcing to precede permanent Vines; and in others they are used to supply the place of established Vines, when the houses or borders may be undergoing some change affecting the immediate crop.

The cultivation of the Grape Vine in pots has become, therefore, a very important section of Vine culture, and requires special notice. The manufacture, if we may so term it, of "Pot" Vines in many of the leading nursery establishments is a very important matter. It would be interesting, were it possible of computation, to ascertain the number of young Vines annually grown and disposed of, both as planting and fruiting Vines. It amounts to many thousands—we hear, indeed, of as many as five thousand being produced annually at one establishment. What becomes of this vast host it would be still more difficult to ascertain, but probably not a tenth part of the number ever become permanent Vines. Suffice it thus far to indicate the importance of the trade.

The growing of Vines in pots is of a two-fold character, two distinct purposes being in view; firstly, that of producing Vines for planting, subsequently to be grown as permanent Vines; and secondly, that of producing Vines for fruiting in pots.

Some first-class cultivators grow on the Vines obtained from eyes "struck" in early spring to their "fruiting state," the same season. Others "strike" the eyes and grow the plants on till the end of the season, and the following year cut them down, re-pot, and grow again, thus occupying two years in producing a similar result. The one-year-old plants, if properly grown, are generally considered the better; but as they are only produced under very favourable conditions, and require an excessive amount of care and attention, they cost, possibly, more than the two-year-old plants, or "cut-backs," as they are familiarly called. In nursery establishments those Vines that may not arrive at the proper standard of fruiting strength may be utilised as "planters," but in private establishments the Vine that is grown for

fruiting, and is not sufficiently strong, is a useless incumbrance. Vines for fruiting in pots should be well grown or not at all. There is no plant that repays better for proper care and attention, yet a very little neglect involves total failure.

As a rule, the numerous young Vines required for all purposes are reared in nurseries, and sold for planting or fruiting, as the case may be. There is no actual difference in their cultivation in the nurseries from that followed in any other well-conducted garden, except that often a larger number have to be produced from a given space, and consequently they must be grown closer together.

The practice generally adopted for the production of Fruiting Vines in one year is as follows:—

1. *Propagation.*—Full instructions on this part of the subject are given in chap. ii., to which the reader is referred. We commence here with the "eye," rooted and growing in a sixty-sized pot.

2. *Potting, etc.*—Liberal pot room must be provided so as to grow the Vines quickly. Therefore, as soon as it is found that the roots have reached the bottom or sides of the pot, re-pot into a five-inch or forty-eight-sized pot, and from this, immediately the roots have again reached the bottom, into an eight-inch, and from this into a ten-inch or twelve-inch pot, which is called the fruiting pot. This last size will be found quite large enough for all practical purposes. Plants that are intended to be grown the second year need not be potted in larger than five-inch or eight-inch pots. After the last shift, which should not be later than the beginning of July, when the pots get well stored with roots, they should be liberally top-dressed from time to time; this top-dressing, which may be raised above the rim of the pot, will be found to get well filled with fibry roots.

3. *Soil, etc.*—The best light, fresh, fibry loam that can be procured should be chosen for the first potting, with broken charcoal, and a little bone-dust and decayed manure; the rougher the condition in which it is used the better. The pots should be carefully and efficiently drained—this is a very important matter. For the second and third pottings the soil may be somewhat richer and stronger. Pot Vines cannot be grown in poor soil. Top-dressings should consist of equal parts of decayed manure and loam with some horn shavings or bones. Care must be taken in potting to have the soil of the same temperature as the houses in which the plants are growing, and the Vines should be potted in the same place if possible, so as to prevent any possibility of chill from exposure, any check to their growth arising therefrom being extremely injurious to them at this stage.

4. *Watering, etc.*—Abundance of water is at all times necessary for growing Vines; they should never be allowed to become dry, and should be syringed several times a-day, and the atmosphere kept continually charged with moisture. When the fruiting pots are fully charged with roots, liquid manure should be frequently applied.

5. *Temperature, Bottom-heat, etc.*—Vine-eyes, on being struck, should be plunged in a bed having a bottom-heat of 80° and an atmospheric temperature by fire-heat of 65° or 70°, which by sun-heat may be allowed to rise to 90° or 100°. Too much sun-heat can scarcely be indulged in, if the atmosphere is plentifully charged with moisture. The same regulations as to temperature apply throughout the season, or until the Vines begin to ripen. Bottom-heat, *i.e.*, the plunging of the pots in a heated medium, is not requisite when the plants become large. Some cultivators, however, continue to maintain bottom-heat in one form or another during the whole growing season.

6. *Training, Stopping, etc.*—As the young Vines grow they require to be staked, and to have the tendrils and lateral shoots pinched off as they are put forth. The leading shoot should not be stopped until it has grown to the required length. Some recommend stopping it when about eighteen inches in length—about the time the plant is fairly rooted in the eight-inch pot—and training up, not the first, but the second lateral shoot that is produced, to form the stem. This stopping is believed to concentrate more strength in the lower portion of the stem, but we have not found it of any practical utility. The young stem, although appearing slender when eighteen inches or so in length, rapidly gets thicker and stronger if properly cared for. When the Vines have arrived at their full length, from six to eight or ten feet, as the case may be, this being generally regulated by the size of the pit or structure in which they may be grown, they must be stopped; and the laterals, as they appear, must be closely stopped also to the first leaf, in exactly the same manner as recommended for permanent Vines. When the canes have ripened, which may be in November, they should be at once pruned; that is, all the lateral spurs should be cut off, and the stem cut down to the length required—from five to eight feet, according to its strength.

7. *Position, Situation, etc.*—The young Vines whilst growing should be kept as close to the glass as possible, and as they increase in length a good situation for them is along the front of a low pit or house, training the rods to a trellis against the roof. In this manner the whole of the leaves, etc., are fully exposed to the sun's influence, and well-developed fruit-buds are produced the entire length of the rod. This is why home-grown Vines are often superior to nursery plants; because in nurseries, they are mostly grown in a vertical position, and being necessarily thickly placed, plump and well-developed buds are frequently only produced at the top of the canes.

8. *Ripening the Canes.*—The ordinary method, towards the end of the season, when the Vines are fully grown and show signs of ripening, which they will do naturally, is to give gradually more air and less water, and after a short time to allow them to be fully

exposed or removed to the open air. The plants, however, should never be allowed to flag or to suffer by the want of water. This is a practice followed by some cultivators, which is calculated to seriously injure the Vines.

The Production of Fruiting Vines in Two or more Years.—The treatment to be followed is practically the same as that required for the one-year old Vines, with this difference, that instead of "eyes" to be propagated, it is young plants which have to be dealt with. In winter these young Vines should be cut down to one or two eyes or buds, and in January or February the pots should be placed in heat. As soon as the "eyes have started," the plants should be re-potted, the old soil being all shaken out and new soil applied. The smaller the pot that will contain the roots the better. These should be plunged in bottom-heat, and potted as required, and as already directed. These "cut-back" Vines having somewhat the start of the "eyes," generally form the largest and strongest plants. They may be, and are sometimes, grown to a great size, and potted in large pots, when they produce enormous crops, some twenty-five or thirty bunches on a single Vine, notable examples of which have been often exhibited by Messrs. Lane & Son, of Berkhamstead. Some of these large Vines may be fruited in pots for several years.

The Production of Pot Vines by Layers.—Mr. W. Miller, gardener at Combe Abbey, Coventry, practises another mode of raising pot Vines, viz., by layering, which is the simplest and easiest of all, and can be followed by any one in possession of a Vinery and a Vine, no elaborately heated propagating pit being required. This plan, as explained by Mr. Miller, consists in growing during the one season a young rod or two from near the base of the Vine it is wished to propagate; then in the early spring following, having such a young cane provided, to train it along horizontally, and having placed a number of eight-inch or ten-inch pots, filled with good soil, in a row on the border, or on a convenient shelf, to fix the shoot firmly by a stout peg in each pot, to cover over with a little soil, and then to water thoroughly. The operation is then complete, and shoots are very speedily produced if the soil is kept in a properly moist condition. Care must be taken to place the pots immediately under the eyes, and every eye thus placed produces a plant. Vines thus layered in April, if the Vines are in a growing state, may be cut away by the middle or end of May, the plants being then several feet in length, and the pots full of roots.

CHAPTER XVI.

FRUITING VINES IN POTS.

THE advantages derivable from growing Grape Vines in pots are various. Pot Vines are extremely handy, and may be utilised at any time and almost anywhere. It is, perhaps, not so difficult to obtain the fruit on the prepared plant as it is to grow the Vine itself. For an early supply of fruit, however, considerable care and attention are required, and failures are more common than successes.

The varieties best suited for fruiting in pots are the free-bearing kinds, such as Black Hamburgh, Royal Muscadine, Foster's White Seedling, and, indeed, all the Chasselas group, Madresfield Court, Royal Ascot, and Alicante. The Muscat of Alexandria is difficult to cultivate in pots, and Gros Guillaume scarcely shows any fruit.

The forcing of pot Grapes may commence in November, or at any subsequent period. Those selected for early forcing should be the earliest ripened, and the canes should have been pruned quite a month before their introduction to heat, otherwise they may bleed. The use of well-ripened canes is a most important matter for early forcing.

A low house or pit is the most suitable for pot Vines. They have simply to be placed on a shelf along the front; or the pots plunged in a slight hot-bed, the rods or canes being allowed to hang loosely until such time as the buds commence swelling. The temperature at first should not exceed 50° by artificial heat, but must be increased as the eyes break and growth begins to 60°, and about the flowering period to 70° or thereabouts. With sun-heat the temperature should, of course, range much higher, but in this respect the treatment of pot Vines as regards general management, atmospheric conditions, ventilation of the house, etc., is exactly similar to that of the ordinary Vinery.

At Syon House, Brentford, the seat of the Duke of Northumberland, pot Grapes have for many years been a special feature. The late Mr. Woodbridge used to commence forcing the first week in November, so as to have Grapes ripe about the end of March or the beginning of April. He commenced with a temperature of 60°, rising 3° or 4° as the buds broke, and gradually increased it to 70° or 75° by the time they were in flower, then lowering it to 68° until they had done stoning, etc., when it was again raised to 70° until the

Grapes began colouring. Mr. Woodbridge allowed a rise of 5° by fire-heat on dull days, and 10° more by sun-heat, giving more air as the temperature rose. The pots used were eleven inches in diameter.

After the Vines are placed in heat, water must be very sparingly applied for some time, until the roots commence growing; otherwise the soil will become sour and the roots will decay, so that it is better to allow them to become a little dry than the reverse. As the plants come into full leaf a copious supply of water will be required. Whilst the fruit is ripening the most extreme care is necessary—especially if the crop is a heavy one—to maintain the Vines in a thoroughly healthy state. Careless watering, such as allowing the plants to flag one day and to be soddened the next, will destroy the best of crops; indeed, more failures are attributable to careless watering than to any other cause. Liquid manure should be frequently given to the healthy plants.

Re-potting is, as a rule, seldom required; but if a Vine should chance to get into a sickly condition, it is better to re-pot. The best time to do this is about the period of the setting of the Grapes, the roots being then in an active state, so that they soon take to the new soil. If re-potted earlier, we have found them to show badly, and thereby fail to produce a crop. Top-dressings of manure and soil, or of soil mixed with horn or bone shavings, etc., should be freely applied.

Some difficulty is often experienced in getting the early-forced Vines to break regularly. When this is so, the canes should be bent so that the backward eyes may be the most elevated, which will help them to develop into strong shoots.

As to their cropping capabilities, a strong Black Hamburgh Vine, in a twelve-inch pot, may be allowed to bear eight or ten pounds weight of Grapes—from six to eight fair-sized bunches. A Royal Muscadine Vine should bear from ten to twelve bunches; but all this is dependent upon the health and strength of the plant. It is better to under-crop than over-crop pot Vines, for the fruit on those over-cropped is sour and useless.

Modes of Training Pot Vines, etc.—The ordinary or utilitarian method is to train them to a fixed trellis, the Vines being placed about two feet apart, so that when the side shoots with the fruit, etc., are trained out, the whole trellis may be covered. Another mode is to twist the canes coil fashion round two or three strong stakes placed in the pot, thus giving the plants when fully grown the appearance of columnar bushes. Another mode is to train the shoots so as to form a sort of umbrella-shaped head, with the bunches hanging round. These latter are all more or less graceful and ornamental, and the Grape Vine is truly ornamental.

CHAPTER XVII.

POT VINES FOR TABLE DECORATION.

A VERY pretty system is that of rooting the stems of a Vine in small pots, and when the Grapes are ripe, dissevering the canes from the parent stock, then objects of ornament for the dinner table or elsewhere are provided. This is shown in the illustration here given, fig. 31, which represents a pot Vine grown and

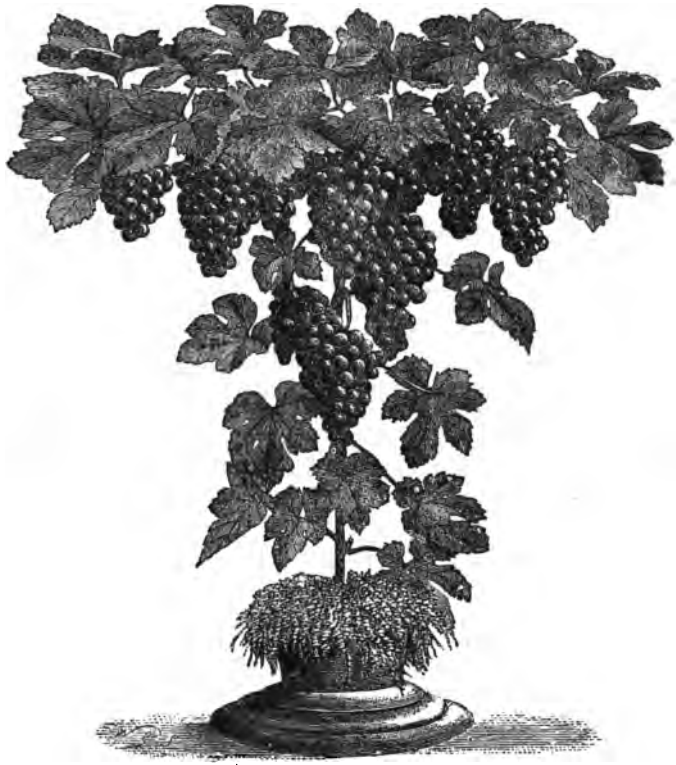

Fig. 31. Pot Vine Grown by Mr. Sage.

exhibited by Mr. Sage when gardener at Ashridge Park, who was very successful in cultivating the Vine in this manner.

Mr. Sage's method of obtaining such excellent examples was as

follows:—When the Vines are about to be started into growth, iron standards are fixed in the ground near to the Vines, these standards being provided with rings at the top suitable for holding or supporting the pots in which the Vines are to be layered. The rod or cane of the Vine is taken through the bottom of the pot to the length required, and then tied, the shoots being afterwards trained to a wire frame or trellis which is placed in the pot for that purpose. As the buds break all those below the pot are rubbed off, and when those above have obtained a length of seven or eight inches, they are stopped in the usual way.

The pots being filled with suitably prepared soil, which must be pressed down rather firmly, some Selaginella is planted on the surface, and the whole is well watered. As the pots become filled with roots constant attention to watering is required. When the Grapes are ripe the cane is cut through by degrees close to the bottom of the pot, and the plant is found to be established in the small pot.

The size of pot mostly used for this purpose is that which is termed a thirty-two (six-inch) or a twenty-four (eight-inch), but plants of any size almost may be thus layered, and grown in any form which fancy may dictate.

Another very pretty mode of obtaining small fruiting Vines in pots for dinner-table decoration, is that noticed by Mr. Anderson in the *Gardeners' Chronicle*, N.S., viii., 103, as having been practised by Mr. Lewin, gardener at Drumpellier, Scotland. This consists simply in placing the pot Vine on a shelf, and training it horizontally along, and subsequently placing five-inch pots filled with soil underneath. The Vine is then allowed to form roots into the pots, which it does quite readily, and the shoots on which the fruit is borne being trained upright, are cut away when fully rooted. Thus several small "Tom Thumb" Vines, with one or two ripe bunches, are obtained from a single plant.

CHAPTER XVIII.

GROUND VINERIES.

AS already stated, the Vine may be grown in a very circumscribed space, and under very diverse conditions. The cottager with his single rod of ground may, by aid of old Father Sol and a few squares of glass, supplemented by care and attention, produce his own Grapes nearly equal to those of his lordly neighbour with his costly Vineries and gardening skill. Thanks to the introduc-

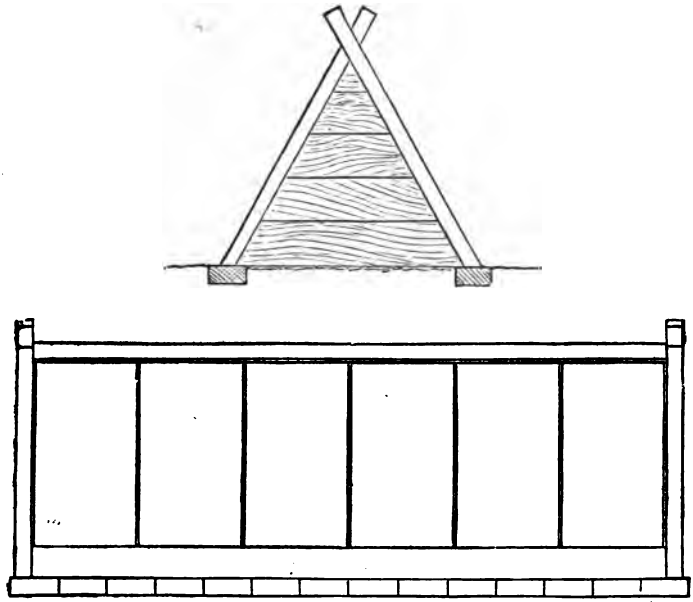

Fig. 32. MR. HARRISON WEIR'S GROUND VINERY.
Scale half-an-inch to a foot.

tion of cheap glass, and the examples of such worthy men as the late Mr. Thomas Rivers, Dr. Newington, and Mr. Harrison Weir, the success of ground Vineries has been thoroughly established.

The magnificent examples of Grapes grown in ground Vineries by Mr. Weir, consisting of such varieties as Black Hamburgh, Muscat

Hamburgh, Muscat of Alexandria, and especially of Muscat Champion, all of which have been exhibited to the Fruit Committee of the Royal Horticultural Society, have proved to be of very superior quality. Mr. Weir has kindly furnished the following particulars as to his mode of culture, which we here give *verbatim*:—

"The Vineries should be made of good yellow deal, and well painted with patent indestructible paint, then glazed, and if putty is used it should be painted over afterwards. I prefer a dark chocolate, as it prevents the lines of the Vinery being seen and looking unsightly, as they do when painted white. This is, of course, a matter of taste, and makes no difference to the growth of the Vine. The glass should be clear and stout, twenty-one-oz. is the best, for if too thin there are more breakages.

"The Vinery should be made in a form and size shown in fig. 32. The Vines should be planted inside the Vinery, and trained along the top, not to the structure itself, but tied to a stout strong pole going the whole length of the Vinery, and hung somewhat from it, so that the string or fastening may not be tight. The lights should never be taken off, neither summer nor winter for a permanence, nor even left off for a single night, unless it be very hot weather, and for the purpose of ripening the wood. The bunches of fruit should be thinned in the usual way, and not too many bunches left on, as that will retard the ripening.

"Nearly all the cool-house Vines may be grown in this way, and, in most instances, with great success; but, of course, much depends on soil and situation."

The Vinery, fig. 32, is seven feet in length, one foot ten inches wide, the sloping ends each two feet eight inches, and the height from ground line one foot ten inches. The ends are of wood, with an air-hole for ventilation, provided with a door to be closed when required.

As Mr. Weir observes, "much depends on soil and situation." There would be little hope of succeeding with ground Vineries in a cold, low situation. An open, dry, sunny situation, such as that enjoyed by Mr. Weir, at Brenchley, Kent, is the sort of place to achieve success. Soil is of less importance, because that can be supplied, but a good climate is essential.

CHAPTER XIX.

THE GREAT GRAPE CONSERVATORY AT CHISWICK.

THIS noble Vinery was originally erected as a Plant Conservatory, forming the first portion of a grand building in the form of a + with a central dome, projected for erection in the Horticultural Gardens at Chiswick, when Chiswick was at its zenith, and the leader of horticultural progress. It was built by Messrs. Bailey, of London, nearly sixty years ago, and, as we were informed by the late Mr. R. Thompson, the cost was something about four thousand five hundred pounds, a heavy duty then existing on glass. It is a span-roof curvilinear structure of iron and glass, one hundred and eighty feet in length, thirty feet in width and twenty-six feet high, running east and west, and heated by two of Stevenson's patent boilers, fixed by Messrs. Burbidge and Healy. Ventilation is obtained by ventilators on both sides over the piping, and from a ridge lantern; this although apparently very limited, is very perfect and quite sufficient.

In the year 1857, the cultivation of plants having been abandoned, it was proposed by the late Mr. G. McEwen, then superintendent of the Gardens, to plant it with a collection of Vines, and this was accordingly done. Borders on the most limited scale were prepared, both inside and outside; that on the outside was about five feet in width, bounded by a broad gravel walk on a raised terrace; and that inside the house was about nine or twelve inches in depth, and formed on the surface of the stone pavement of the conservatory.

There was much speculation as to whether Grapes would succeed in so large a structure. The pessimists predicted that scorching and burning would prevail, and that under so much glare and light and with so little ventilation, the Vines would never succeed; and it seemed, for the first year or two, that such would be the result, for whether from mismanagement, or from some other cause, the Vines did very badly, and in 1858 were nearly destroyed by mildew.

In the year 1859 it was our lot to take charge of this Vinery, and under careful management we may truly say that the young Vines rapidly improved, and year by year they have borne excellent crops of fruit, which have been reported on from time to time by the horticultural press.

The Vines were at first planted alternately in the inside and outside borders, and for several years, by means of heavy mulching and top-

dressing of the inside borders, the vigour of the inside Vines was maintained nearly equal to that of those planted in the outside borders, but gradually they became weaker, and it was at length determined to destroy all those inside the house, and to extend those in the outside borders. The gravel walk on the top of the terrace was removed to its base, and the border was extended to a width of fifteen feet, as it now exists. Fresh soil—fresh to the Vines at least, for it was but the top spit cut from the lawn in the garden—with a mixture of ground bones, manure and burnt ashes being supplied, the Vines grew with increased vigour, and the first year after losing all the inside Vines, the crop was greater than before. The finest Grapes were probably produced when the Vines were from six to ten years old, and those on the south side have always been superior to those on the north, from the greater amount of shade, no doubt, injuriously affecting the latter.

The Vines are pruned on the spur system, the length of the rod from the base to the apex being about thirty feet. Thus it takes from five to seven years to reach their limit, by which time the lower spurs show signs of weakness, the best fruit being always produced on the younger wood at the top. To maintain their vigour, a supply of young rods is provided, and the old stems from time to time cut out. Thus gradually the Vines have extended from one stem or rod to many, forming a good example of what is termed the extension system.

A great number of varieties were at first planted, thus affording an excellent opportunity for the determination of their distinctive characters, which up to that time there had been no opportunity of doing so well. The Fruit Committee having been established about the same period, frequent investigations of the Grapes growing at Chiswick were made by that body, and correct descriptions of the different varieties were, at the same time, drawn up very carefully by its secretary, Dr. Hogg.

Many of the varieties originally planted proving to be utterly worthless, were cut down and grafted with other sorts. This proceeding afforded some interesting illustrations of the suitability of Vine-stocks. So far, however, no very correct basis has been secured, as many unknown worthless varieties were grafted with others equally worthless. A few cases, however, are worthy of mention. Thus Gros Guillaume worked on an adjoining rod of the Black Hamburgh produced fruit much superior to that on its own roots, and very similar to that of the Black Hamburgh, but this peculiarity continued only for a few years. Muscat of Alexandria grafted on a late Spanish Grape, although situated at the warmest end of the house, has every year produced fruit later and inferior to that on its own roots. Black Hamburgh worked on Blussard Noir always produces bunches and berries smaller than the others. Muscat Hamburgh grafted on

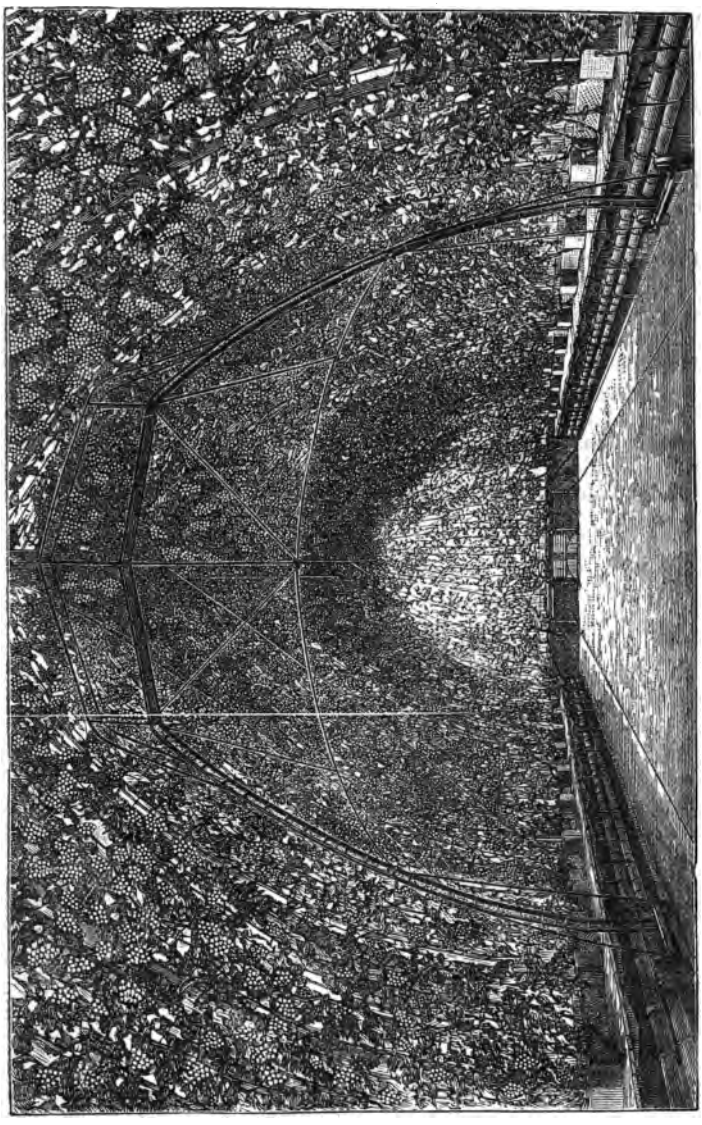

Fig. 33. VIEW OF INTERIOR OF GREAT CONSERVATORY AT CHISWICK.

Siderites (Smyrna), a large, late variety, proved so inferior in quality and appearance that the members of the Fruit Committee failed to recognise it as being the same variety.

At the present time the varieties cultivated are chiefly those standard sorts which have been found suited to the house, viz., Black Hamburgh or Frankenthal, which is the best of all, Alicante, Gros Guillaume, Madresfield Court, Gros Colman, Lady Downe's Seedling, Black Prince, Black Monukka, West's St. Peter's, Dutch Hamburgh, Buckland Sweetwater, Raisin de Calabre, and Muscat of Alexandria.

The greatest number of bunches produced in one season was four thousand five hundred, their aggregate weight being somewhat over two tons.

The ladder employed for gaining access to the Grapes deserves a word of mention. This is formed of wrought angle iron, and runs on wheels, being moved with ease by one man at each side. It is so constructed that the men, in whatever position, are within easy reach of the Vines. From ten to twenty men may be at work on it at one time. It was constructed at a cost of thirty pounds, from designs supplied by us to a working blacksmith in Hammersmith, and has been found to effect an immense saving in labour and glass over the ordinary ladders formerly in use. The illustration, fig. 33, which shows the ladder *in situ*, is taken from a photograph.

CHAPTER XX.

VINES ON OPEN WALLS.

THERE is no doubt of the fact that in former years Grapes were much more extensively grown in the open air in this country than they are at the present time. This may be ascribed to various causes, and among others to the following:—

1. The introduction of *cheap glass*, whereby structures may be erected at a moderate cost, for the cultivation of the Grape Vine with a considerable degree of certainty. It is not to be supposed that in olden times the seasons were always propitious and suitable for Vine growing any more than they are at the present day; although we read of Mr. Joseph Kirke exhibiting, before the Royal Horticultural Society in 1818, Royal Muscadine Grapes grown on open standard Vines, which were said to be of very good quality.

2. *The Mildew*, the intrusion of which scourge to the Vine, in the year 1847, has rendered its cultivation in the open air in this country extremely precarious. Although sulphur is well known as a remedy, its application to Vines in the open air is not so easy to accomplish, and, therefore, not so effectual in its results as could be desired. It is very seldom now that out-door Grapes entirely escape this malady.

3. A series of *Cold Sunless Seasons*, in which the out-door Grapes have seldom ripened, so that their cultivation has gradually come to be abandoned.

If a little more attention to the proper cultivation of the plant, and to the thinning and taking care of the fruit, were given, no doubt better results would follow; and it seems a pity we do not see Vines more frequently adorning the walls of our cottage homes in the more southern parts of the country. There the Grape Vine is not only ornamental but useful. As a plant it is perfectly hardy, and it grows freely. In spring the young shoots are sometimes injured by late frosts, and in cold seasons the wood does not ripen thoroughly, but it is the fruit that is tender, and that only in so far as it generally requires more heat than our climate affords it to ripen.

In regard to cultivation on open walls we may note:—

1. *Soil.*—The Vine will grow in any good garden soil, provided it is freely exposed to light and air, and well drained; the more of a loamy character it has, and the fresher it is, the better. Before planting, the soil should be well dug or trenched to a fair depth, and some good manure, ground bones, etc., applied.

2. *Position.*—This must be warm and sheltered, on a wall facing the south, or a roof sloping to the same aspect. It is useless to plant Vines in this country on any other aspect.

3. *Planting.*—This should be done as early in the autumn as possible, so that the roots may get into action before winter, otherwise it is better deferred till spring is well advanced.

"For planting Vines the blush of spring is best,
. . . or else autumnal cold."

4. *Pruning and Training.*—This must to a certain extent be very similar to the practice adopted under glass. Vines to be trained to single stems should be planted about three feet apart, and pruned on the spur system, the shoots or spurs being allowed to form at about fifteen inches apart. It is preferable, however, to allow Vines on open walls to cover a greater space, and to have many stems or branches. These may be trained in an upright or vertical direction, at about eighteen inches apart, and may be pruned on the spur system; a preferable method, however, is that of training the stems in a horizontal direction. Thus, at the first pruning, the Vine is cut down to a height of about eighteen inches, and three shoots or stems trained up the first year; at the winter pruning one of these branches is trained out horizontally to the right, the other to the left; these being pruned according to their strength to four or five feet in length, form the first or lower tier of branches on which the fruiting shoots or spurs are to be produced. The third shoot is trained upright; if strong it may be pruned to four or five feet long, and the following season one or more side branches added in a similar manner, the distance apart being fully eighteen inches. The fruit-bearing shoots may be about twelve inches apart, and all nailed in on the upper side of the branches only. Vines so trained may be extended to any distance, and pruned in winter in the usual manner. Disbudding must be carefully attended to, and the bearing shoots regularly stopped at one leaf beyond the fruit, and all the lateral shoots subsequently produced must be carefully removed.

To secure the best results the bunches and berries should be carefully thinned, and in the case of white Grapes, fully exposed during the ripening period to the rays of the sun. If long straggling bunches are produced, it is better to shorten them, as short compact bunches ripen best.

In regard to the most suitable varieties for cultivation in the open air, the greater portion of the Sweetwater section, with a few of the smaller Muscats, will be found more or less suitable. In France the variety met with is invariably the Chasselas de Fontainebleau, which in this country is known as the Royal Muscadine. As grown in France, with the beautiful cinnamon-russet colour, it is very rich and pleasant. The Royal Muscadine is, at the present time, the leading Grape for out-door culture. A much better variety, not yet sufficiently well known, is the Chasselas Vibert, which produces larger berries and ripens about a week earlier than the Royal Muscadine; Ascot Citronelle and Grove End Sweetwater, Miller's Burgundy, Black July

and Gamay noir may also be recommended. In some warm seasons the Black Hamburgh ripens its fruit very well.

In seasons when the Grapes on open walls do not ripen thoroughly or sufficiently to be used for dessert, they may be made into very wholesome wine. Mr. Fenn, when at Woodstock Rectory, submitted to the Fruit Committee some examples of wine made from Grapes grown in the open air at that place, which were considered to be of excellent quality, and met with the highest approbation. Half-ripened Grapes make also an excellent preserve. We have tasted some excellent Grape jelly made by Mrs. Wildsmith, at Heckfield, from the thinnings of half-ripened fruit.

At Thomery, near Fontainebleau, Grapes are cultivated largely on walls, and the training attended to with very great care, the general result being extremely satisfactory. The method practised is simply that of planting a number of Vines at twenty inches apart, and so arranging that each Vine is trained horizontally at different heights of the wall. This, when well carried out, is extremely pretty, but entails much skill and labour in the training or formation of the plants.

CHAPTER XXI.

VINEYARD AT CASTLE COCH, CARDIFF, SOUTH WALES.

THE Vineyard at Castle Coch was planted in the spring of 1875, on the French system, as practised in the neighbourhood of Paris, Burgundy, and in the Champagne district. The Vineyard lies to the south of the Castle, at a somewhat lower level, with a gentle slope to the south, and from the nature of the ground, it requires no artificial drainage. The soil, two feet deep, is a light fibrous loam, resting on limestone rock. The Vines are planted in rows from north to south, three feet apart, and the plants are three feet apart in the rows, and trained to stakes four feet high, and pruned to within three buds of the previous year's growth every year.

The first wine was made in 1877. The crop was not a heavy one, but sufficient to make about forty gallons of wine. In 1878 the crop of Grapes was better, but in the two following years it was a complete failure, owing to the cold, wet and sunless summer of 1879, in which the canes did not ripen. There was a good crop in 1881, the wine was of the best quality, and pronounced by the Fruit Committee of the Royal Horticultural Society to resemble a first-class still champagne. The whole of the vintage (except a few dozen) was sold readily at 60*s.* per dozen. The years 1882 and 1883 were complete failures, in which no wine was made; but since 1884 more or less wine has been made every year.

In the Jubilee year (1887) the vintage produced nine hogsheads of excellent wine; the crop was the largest and best ripened since the Vines were planted. Lord Bute is so far satisfied with the results of the experiment, that he has begun planting a large Vineyard on his estate at Swanbridge, and a smaller one at St. Quentin's, near Cowbridge, with the idea of further experimenting upon the soil and situation best adapted for the cultivation of the Vine in the open air in South Wales. The variety found to prove the sturdiest and to answer best is named Gamay Noir, a variety which is grown largely in the south of France for wine making.

CHAPTER XXII.

COMMERCIAL GRAPE CULTURE, OR THE GROWING OF GRAPES FOR MARKET.

THE extraordinary increase in the cultivation of Grapes for sale or market purposes, and the rapid development of the trade in this fruit during the past few years is altogether of a very remarkable character. No other fruit, excepting the Tomato, has ever advanced so rapidly into popularity and general use. A few years ago, Grapes could only be obtained by the wealthy in small quantities, and at high prices; now they form a staple article of commerce, and may be obtained in abundance and at a moderate price in all parts of the country, and at all seasons.

It is important to note the causes which have led to this result. Partly, no doubt, it is owing to the introduction into cultivation of good late-keeping varieties of Grapes. Chiefly, however, it is due to the Tomato. Extraordinary as it may at first appear, it is the great popularity and demand for Tomatos which has rendered the cultivation and the present enormous supply of Grapes possible. Both crops requiring much the same treatment, houses erected for Grapes are at first cropped with Tomatos, which producing an immediate return help the growers to tide over the first two or three years whilst the Vines are getting established; in this way we are provided with a bountiful supply of the most luscious and enjoyable fruit this earth produces.

The magnitude of the trade in Grapes that has thus arisen is of the utmost importance, and can scarcely be over estimated. An enormous amount of capital has been called into requisition, and is engaged in the furtherance of this trade. Directly and indirectly many thousands find employment, and are thus benefited by Grape-growing. We do not ourselves know of any industry that can compare, or which has done so much in so short a time for the welfare of the people. The approximate supply in 1886 of what are termed English-grown Grapes, amounted to about 400 tons, one commission agent in Covent Garden (Mr. Monro) disposing of forty thousand baskets, or an equivalent of about two hundred and fifty tons. During the past year, 1891, this quantity has been greatly exceeded. The greatest quantity ever sold in one day was in October, 1891, and amounted to 4 tons = 750 baskets.

The chief producing establishments are to be found within a comparatively easy distance of London, so that the fruit may be delivered by van without the intervention of the railway; the Grapes are thus obtained without a blemish in the best possible condition. Several of the Vineyards or Grape-growing establishments are of a leviathan character, whole fields being covered with glass, presenting in some

parts of the country quite a novel feature in the landscape. Every year these are more and more extended. At the present time the largest growers are probably the Messrs. Rochford, who in their several establishments in the neighbourhood of Cheshunt, Broxbourne, etc., have over fifty acres covered with glass, about one half of which is planted with Grapes, from which they calculate to produce about 300 tons a year, when the Vines come into full bearing—an acre of ground covered with glass being estimated to produce fifteen tons of Grapes annually. Reckoning the value of the crop at 2*s.* per lb., the gross return per acre thus amounts to £3,360. Of other large growers in the London district may be named Mr. Peter Kay, of Finchley; Mr. Ladds, of Bexley and Swanley; Mr. Sweet, of Whetstone, and many others.

Another great centre for Grape-growing has arisen at Worthing, in Sussex, from whence some 300 tons are sent to Covent Garden every year, and is still extending; the principal growers are Mr. N. Piper, Mr. Bushby, Mr. G. Russell, Mr. Sams, and Mr. Beer. In Scotland also, Grapes are largely grown for London markets by Messrs. Thomson & Sons, at Clovenfords, Galashiels; and Mr. D. Beatson, of Kirkaldy. Of Grapes grown in the Channel Islands, especially Guernsey, the quantity is simply enormous. According to official returns in 1876 the shipments, *via* Southampton, amounted to 50 tons, whilst in 1886, ten years later, the total was over 500 tons, of which one salesman in Covent Garden, Mr. G. Monro, sold on commission over 300 tons, and in 1890-1 about 350 tons. Although the production has very greatly increased, the quantity sent to Covent Garden does not appear so great, increased facilities for transmission having spread the trade in these low-priced Grapes to the provincial towns, Mr. Monro, for example, selling in Manchester, on commission last year, over eighty tons of fruit.

Twenty or thirty years ago the best Grapes that were to be seen in Covent Garden were chiefly the produce of private establishments. Now very few of these are received. This is partly owing to the superior quality of the Grapes grown by the market men, and partly to the great fall in prices, the returns for small quantities being barely sufficient to pay expenses.

Market Grapes.—Of varieties grown for market, the chief for early and summer use, up to the month of December, is the Black Hamburgh; succeeding this, for late use, is the Gros Colman. No other Grapes command the market to any extent. Lady Downe's Seedling, a few years ago, was the favourite late Grape; now it is of comparatively little value. Black Alicante commands a fair price up to a certain period, and Madresfield Court is approved as an early sort. Amongst white Grapes, the Muscat of Alexandria is the first favourite, and Buckland Sweetwater second.

Culture, Soils, Manures, etc.—There is no practical difference

between Grape-growing for market and that for private establishments, only that it is carried on in larger houses for the former and with an all-absorbing one-idea object—profit. By avoiding mixed collections and cultivating only one sort in a house, market growers are enabled to give that variety whatever special treatment it may require, which in itself is a great element of success. The houses on being erected are for the first two or three years devoted to the cultivation of Tomatos, the Vines, although planted in the usual manner, receiving quite a minor share of attention for a year or two until they require the space. Then the Tomatos have to give place, and more glass has to be erected for *their* cultivation, and so on, extension becoming almost compulsory. In regard to soils, market growers are not very particular, generally using whatever is most convenient; the better the soil, no doubt the greater the success. This is an important matter to take into consideration in establishing a Vineyard. One of the most successful cultivators, Mr. Kay, of Finchley, is favoured with the finest of soil—a somewhat heavy yellow loam, which is used unsparingly mixed with bones, Thomson's Vine Manure, etc.; Mr. Ladds uses soil much inferior, manuring heavily with farmyard manures. The Messrs. Rochford having a good loamy soil, with a gravelly subsoil, simply trench the land and plant the Vines, using no manure until they are in fruiting condition; Messrs. Thomson's soil at Clovenfords is inferior, but by using Thomson's Vine Manure magnificent Grapes are grown. Mr. Bashford's Vineyard, in Jersey, is on the site of an old brickfield—all manner of soils—which, before planting, were roughly analysed and manurial substances added, chiefly phosphates, of which they were found destitute. Mr. Pond's Vineries in Jersey are situate on the side of a steep, rocky hill, tier above tier. In Guernsey, Grape Vines may be found growing in hot thin soil, or in heavy loam, and in soils showing a high percentage of sand; in the one case they naturally require much water, in the other drainage, and where these reasonable requirements are attended to, fairly good results are obtained in either. All kinds of manures have been tried on Vines with varying success; it becomes to a great extent a matter of practical experience, not any manure being quite suitable for all soils.

Keeping the Fruit.—A portion of the late Grapes sent to market are cut and kept in bottles of water, as described at p. 65, some of the growers having Grape rooms erected for that special purpose. One of the largest and best we have seen is that at Mr. Bashford's, St. Saviour's, which contains, when filled, ten thousand bunches; it is one hundred and thirty-six feet long and twenty feet wide, having four double and two single racks the entire length of the house. Mr. Kay, of Finchley, and Messrs. Rochford prefer keeping their Grapes on the Vines, and this is the plan now generally adopted by the growers for market, shading the houses with thick canvas, etc., and keeping a cool,

still, dry atmosphere, if possible without fire heat; in this way many tons of Grapes are kept fresh and plump until the very end of March, most successfully. At Messrs. Rochford's, in the month of February last, 1892, we observed over twenty tons of Grapes in fine condition, still hanging on the Vines.

Prices.—These vary according to season, and supply and demand. In our last edition, in 1886, we were favoured by Messrs. Webber, of Covent Garden, with the following list of prices taken from their sale book, showing such prices as were received during that year:—

January ...	Best Black	3/-, 3/6, 4/-	...	Second Black,	2/-, 2/9
February ...	,,	4/-	...	,,	2/6, 3/-
March (began)	,,	5/-	...	,,	4/-
,, (ended)	,,	9/-, 12/-			
April (old) ...	,,	9/-, 12/-	...	,,	3/-
,, (new)...	,,	6/-, 8/-			
May ...	,,	6/-	...	,,	3/6, 4/-
June ...	,,	3/6, 5/-	...	,,	2/-, 2/6
July ...	,,	2/-, 2/3, 3/-	...	,,	1/-, 1/9
August ...	,,	1/6, 2/-	...	,,	-/9 1/-, 1/3
September ...	,,	1/6, 2/-, 2/6	...	,,	-/9, 1/-, 1/3
October ...	,,	1/6, 2/-, 2/6	...	,,	-/9, 1/-
November ...	,,	2/- 2/6, 3/-	...	,,	1/-, 1/6, 1/9
December ...	,,	2/6, 3/-	...	,,	1/9
May	...Best Muscats	6/-, 8/-			
June ...	,,	6/-, 8/-			
July ...	,,	4/-	...	Second Muscats	2/-, 2/6
August ...	,,	3/6	...	,,	1/9, 2/-
September ...	,,	3/6	...	,,	1/9, 2/-
October ...	,,	3/6	...	,,	1/9, 2/-
November ...	,,	4/-	...	,	2/6, 3/-
December ...	,,	6/-, 8/-			

We then stated that these prices were from "25 to 50 per cent. lower than they were in 1876, and would probably still decline." They have actually done so, the prices from Messrs. Webber's books of last year (1891) being 25 per cent. lower in every month (excepting October) than in 1886, and the tendency is still downward, although the prices at the present time seem to be as low as it would appear possible for them to pay, even with skill and capital combined. The chief growers do not, however, trouble themselves much after sensation prices. They base their calculations on the actual costs and gross returns; and argue thus, that to sell a ton of Grapes at two shillings or three shillings per pound is better than, as formerly, to sell a few hundred pounds at ten shillings or twenty shillings per pound—prices which were practically beyond the reach of the consumers. Cheap prices now enable retail fruiterers to maintain a supply on sale at all times, thus increasing the consumption.

This fall in prices has a tendency to induce growers to crop too heavily, and in this way the general quality of the Grapes is not maintained.

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Common Grapes packed badly or damaged in transit, lose, as a rule, about one-half their value, whilst "best" lose frequently two-thirds. Higher prices than those quoted are occasionally received for exceptionally good produce. Guernsey greenhouse Grapes, during the autumn months, make from threepence to eightpence per pound; extra good quality, one shilling or thereabouts. The highest prices are received for late Grapes during March and April. These are, however, subject to considerable discount on account of loss of weight through shrinking. One of the best growers estimates this at ten per cent. up to January, and as much as twenty-five per cent. up to March, so that a hundred pounds of Grapes on December 1st are

Fig. 34. Flat Basket of Grapes packed for Market from short distances. Weight 16 lbs.

reduced to about seventy-five pounds in March. Thus the higher price received at the latter date is practically absorbed. An excellent illustration of this lately came under our notice. Of two houses, each a hundred feet long by twenty-five feet, containing Gros Colman, the crop apparently equal, the fruit in the first house, cut in December, weighed two thousand pounds, whilst that in the

second, cut in March, weighed one thousand eight hundred pounds only — a loss of two hundred pounds by mere shrinking, the fruit having been otherwise well kept.

Packing Grapes for Market.—This is of the first importance, as the prices that may be realised greatly depend upon the condition in which the fruit is received in market. An immense quantity of good fruit is spoiled in transit through inefficient packing by amateur cultivators; regular growers of Grapes for sale seldom make any mistakes of this sort, but send their fruit to market in good condition in baskets specially adapted for this purpose. Of those used in Covent Garden Market, fig. 34 represents what is termed a "flat," that is, a flat hamper containing a basket in which the Grapes are placed, this basket being generally known as a "baby" basket, and such as is used for displaying the Grapes in shop windows. The Grapes, when cut, are simply placed in this basket stalk end upwards, a layer or two of tissue paper being placed over the bottom, or some soft dry moss or wood

Fig. 35. HANDLE BASKET OF GRAPES PACKED FOR MARKET, SENT BY RAIL LONG DISTANCES. WEIGHT 11 LBS.

wool (cotton wool is objected to, as being too heating in warm weather, and it is not so elastic as moss); this is then placed in the square shallow hamper, as shown, and the lid closed down. This mode of packing is used for transit by rail from places not much more than twenty miles distant or thereabouts, where the railway guards and porters are accustomed to the regular handling of the goods. Fig. 35 represents what is termed a "handle basket," recommended by Mr. Webber as suitable for travelling from gardens where only the surplus stock is sold, no regular supply being sent to market. This basket is used for the transmission of all the Grapes from the Channel Islands, no packing is ever used beyond a sheet of paper; the handle is found

useful to lift by, and it also serves as a guard, preventing any other packages from being placed upon the Grapes. In the Channel Islands service, they are packed on the steamers in layers ten or twelve deep, hurdles being used to separate them from each other, and are generally received in excellent condition. They leave Guernsey by the steamer at about midday, and are delivered in London the same evening, in time for market the following morning.

It is not advisable to send Grapes to market on a Saturday.

Structures, etc. — These are in general very large, low, span-roofed, and from one to two or three hundred feet in length. Some of Mr. Bashford's houses measure eight hundred and ninety feet in length by forty-four feet wide, and are remarkably well constructed. Mr. Kay's houses vary from one to two hundred feet in length and twenty-five feet in width, and are so low that the Vines may all be attended to without steps or ladders. Seven span-roofed houses lately

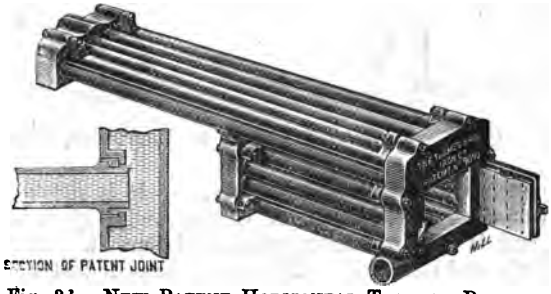

Fig. 36. NEW PATENT HORIZONTAL TUBULAR BOILER.

erected by Mr. Kay measure four hundred feet in length by thirty-six feet six inches in width, occupying, with the borders outside and inside, exactly seven acres.

Messrs. Rochford's structures are so large as scarcely to be called houses. They are mostly erected in great blocks like a number of span-roofed houses joined together, or what might be termed ridge and furrow roofs, covering the entire ground. Here is one block covering three and a half acres of land, another over four acres, and so on the individual spans twenty-eight feet wide and two hundred and eighty feet in length, and many others of nearly equal dimensions—all being efficiently heated. Mr. Thomson's houses at Clovenfords are about two hundred feet long, rather lofty, and at a very acute angle.

Fig. 36 represents the sort of boiler now most generally used by the market growers. These are made of all sizes, some we have seen in use being twenty-five feet in length. They are very powerful, simple, and easily repaired.

English Grapes in America.— A great trade in English winter Grapes seems likely to become established with America. During the past two seasons regular consignments of English Grapes have been sent from this country. They have been found to travel well and to arrive in good condition, and prove of superior quality to American produce during the winter season. They are sent by the Cunard steamers, reaching New York about ten days after being cut; some are sold on arrival at New York, whilst others are sent on to Philadelphia, Boston, Pittsburgh, Chicago, etc.

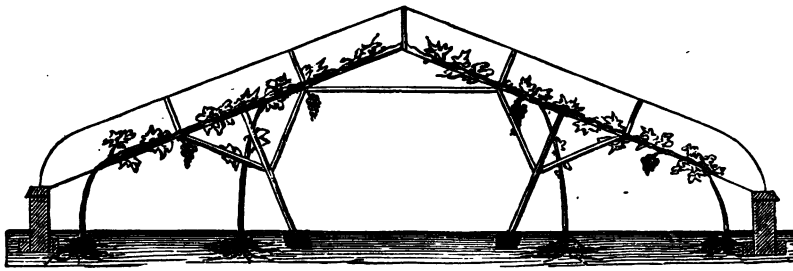

Fig. 37. Cross section of a Vinery at Hoeilaert, Belgium.

Grape growing in Belgium and France.— It is not only in this country where the cultivation of Grapes under glass is receiving attention and is followed as a commercial pursuit. At Hoeilaert, near Brussels, and elsewhere in Belgium, a great industry has sprung up during the past twenty or so years, many acres of land being covered with glass, and devoted to the cultivation of Grapes, etc., for the supply of the Brussels and Paris markets. For some years the cultivation here was very crude, and the houses of the plainest and most primitive character. Fig. 37 is representative of the earlier style; now, however, the culture is greatly improved. In France, also, the country where the Grape Vine is at home, and where *le petit Chasselas* has long been esteemed as the best of all Grapes for dessert (the large varieties being condemned), we find two vast establishments at Bailleul and Roubaix, conducted by Messieurs. Phatzer et Cie., devoted to the cultivation of winter Grapes (chiefly Gros Colman) after the English system. The houses are very long span-roofed, and cover from three to four acres; the cultivation here is excellent. The fruit is all disposed of in the Paris markets at prices very much the same as Covent Garden.

CHAPTER XXIII.

DISEASES AND INJURIES.

THERE are not many plants that are subject to so many forms of disease, etc., or are so easily injured as the Vine. Robust and vigorous as it seems in its rude green health, a very little neglect or a very little damage will soon arrest its progress and spoil its beauty. No plant pays better for the care and attention bestowed upon it than the Vine, or is so easily ruined by neglect.

The word disease is here used in the broad sense in which it is generally taken, although it is scarcely an applicable term for "all the ills" to which the Vine is subject, the more important of which are the following:—Rust, Spot, Scalding, Warts on the leaves, "Bleeding," Shanking, Aërial roots, Fungus on the roots, Mildew, etc. On each of these it is proposed to offer a few observations.

Rust.—This is an affection or injury to the cuticle or skin of the berries, giving them a rusty appearance. It is caused whilst the skin is young and tender, about thinning time, and disfigures them even when ripe. When once it is produced there is no remedy; the only thing that can be done when it is observed is to cut out the affected berries. Many views have been entertained and many opinions have been held as to the causes of rust. Touching the berries with the hand or with the hair of the head are some: it is well, therefore, not to touch or handle the berries in any way since they are so very easily bruised and spoiled. But these are not the chief causes of rust. Cold draughts of air are also suspected; avoid therefore, cold draughts or currents of air whilst the Grapes are young, for they are very injurious, even if rust is not caused by them. Rust is most common in early houses, where a good deal of firing is required, and especially in those where the old-fashioned flues are still in use. An over-heated flue, with the inevitable dry parched atmosphere and occasional sulphurous fumes,

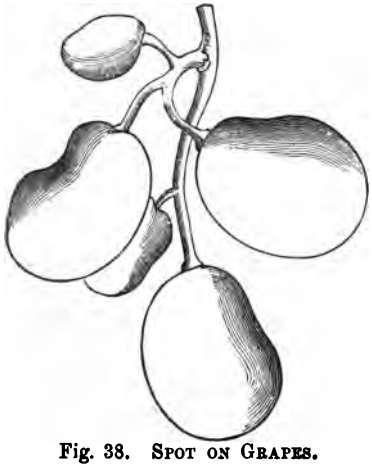

Fig. 38. SPOT ON GRAPES.

will cause rust to a certainty, and so also will sulphur when applied to hot pipes, as is frequently done in order to destroy red-spider. It is good judgment, therefore, to avoid the use of sulphur whilst the berries are very young and tender. Later on the skin becomes more hardened and is not so easily injured.

Spot, fig. 38.—In some cases this appears to be constitutional, or, at all events, some varieties of Grapes are much more subject to this evil than others. It may be noted that where it is regarded as "constitutional," the connection between the affected parts and the seeds and axis of the berry may be traced; in other cases it is more superficial and apparently accidental, or the result of bad health. It is sudden in its action and sometimes very injurious. Muscats are, perhaps, more subject to spot than any other class of Grapes. On its first appearance, which is when the Grapes are young, tender, and swelling fast, a small, irregular, whitish mark is seen on the side of the berry, as if it had been bruised in some way; the pulp beneath dries up and a sort of contraction occurs, the berry soon assuming a one-sided irregular form, such as is represented in fig. 38. In cases where the berries are much affected they should be cut out.

By some cultivators the spot is believed to be caused by sudden chills, such as having the house very close and moist, and then suddenly, on some bright morning, admitting the external cold air too freely and too abundantly.

Scalding.—This is a term applied to Grapes which appear as if they had been scalded; it generally occurs when the berries are about half grown. Sometimes it is but a few berries here and there which are affected, but frequently the entire side of the bunch is damaged, and we have seen cases of nearly the entire crop being lost, the berries being completely destroyed, as if scalded or parboiled. This is caused through late or imperfect ventilation on some bright sunny morning, whilst the internal atmosphere, and even the berries, are saturated with moisture. The varieties most subject to this affection are Muscat of Alexandria and Lady Downe's Seedling.

Warts on the Leaves.—These are merely small green excrescences that form on the back of the leaves, a sort of granulation or extravasation of sap through the skin of the leaf; they are injurious to the leaves, no doubt, as affecting respiration, etc., and are the outcome of some fit of ill-health on the part of the Vine. The affection may be caused by a too close warm atmosphere saturated with moisture. A Vine badly affected by it is a long time in recovering.

Bleeding.—This is an overflow or out-pouring of watery sap, and is at times so severe that the Vines seem as if they would "bleed to death." The Vine is furnished with an enormous supply of watery sap, which begins to flow very freely and with great force shortly before growth commences, and continues until the Vine is about in full leaf. The cause of "bleeding" is late pruning; it results from

the pores, which are naturally open for the flow of the sap, not having time to heal over and close up before the sap gets in motion. The preventative practice, therefore, is the best, and that is to prune as early as possible, and never whilst the buds are swelling.

Various methods have been proposed to stop or arrest this bleeding, such as charring the cut ends of the shoots, or covering them with sealing wax, cut potatos, painters' knotting, or some of the various patent styptics. None of these, however, are effectual when once the bleeding has commenced. It seems almost impossible to close these pores or to arrest this extraordinary tide by artificial means. The painters' knotting will check it to a certain extent, so, we are told, will powdered alum; but some cases are so bad as to baffle all our feeble attempts, and these must be left for Nature herself to cure.

Shanking.—Of all the perplexing maladies that affect Grapes, this is the most obscure; other agencies may destroy a crop, or even the plants, much more speedily and completely, but there is no ill pertaining to Vines the true causes of which are so difficult to estimate and to grapple with as this.

The term shanking is applied to denote the drying or withering-up of the stalks of the bunches and berries of Grapes. Sometimes it is only a berry or two that "shanks," at other times it is the whole bunch, and in extreme cases it may be the entire crop. The period when shanking commences is just as the berries begin to change colour or to ripen, and it continues more or less in action until they are ripe. The berries that thus shank or lose the vitality of their stalks never colour or ripen, but become intensely sour and soon decay, and require to be cut out. In many cases all that the eye can detect is a minute black speck, or a ring round the stem or stalk of the berry; in other cases the whole stem is quite blackened. It may be noted that shanking is far more prevalent amongst late Grapes than amongst early forced ones; and again, that it is but seldom seen amongst out-door Grapes; while some varieties—those of the Frontignan class to wit—are far more subject to shanking than others, such as the Royal Muscadine.

As to the causes of shanking, many and varied opinions have been given. It is not so much, we believe, the result of any one special cause, as of a variety of concurrent causes. In a broad or general sense, shanking seems to be the result of some overstrain—some bad condition of or injury to the feeding or respiratory organs of the Vine. Either the foliage has been in some way injured, or prevented from performing its proper functions, or the roots have got into bad condition, and cannot perform theirs; or it may be that a combination of both these causes exists. As to the immediate or leading causes of shanking, we shall briefly call attention to some of the principal:—

1. *Over-cropping.*—The crop of fruit must be regulated according to the strength of the Vine, and this may nearly be estimated by the

amount of properly developed leaves; so that an over-crop of fruit is tantamount to a scarcity of leaves and overstraining of the powers of the plant, and the result is shanking to a very serious extent.

2. The destruction of the foliage by red-spider, burning, or other causes, which is equivalent to a scarcity of leaves.

3. The stripping-off of a great quantity of fully-developed leaves at one time, as is frequently done by those who neglect timely stopping, which interference with the foliage affects, in a corresponding degree, the action of the roots, and leads to shanking.

4. Chills or sudden changes of the temperature of the house, such as may be experienced on the change or approach of colder weather —a very frequent occurrence in this climate; the evil arising from neglect to reduce or regulate the amount of ventilation, or to use the heating apparatus, which, at such periods, is often, but erroneously, dispensed with.

5. The roots getting into a cold subsoil, or the border becoming sour and soddened, whereby the young spongioles of the roots are destroyed.

6. Planting in borders composed of too rich materials, containing too much organic matter; in consequence of which the Vines grow with great luxuriance, but seldom ripen the wood properly. The roots formed, although plentiful, are very soft and spongy; they do not acquire firmness, but decay during the winter season, and, consequently, the next season a fresh supply of rootlets has to be produced; and then, when the strain upon the energies of the Vine takes place by the demands of the advancing fruit crop, the roots are not in a proper condition to meet it, and, as a result, shanking ensues. This late production of roots, their decay in winter, and the subsequent shanking, may go on year after year.

7. Excessive dryness at the roots, such as to cause injury to these organs. If the border is allowed to get over-dry whilst the Vines are in full growth, the young roots become paralysed, and if they are then deluged with water, they will, as a consequence, be certainly destroyed.

These are several of the causes that directly or indirectly lead to shanking, acting either singly or in combination; yet, when a case of shanking appears, it may be very difficult to trace it to its true origin, or to apply a remedy. Many of the above-named causes may be avoided by good management, as, indeed, they all should; but where the roots are at fault, either through being in a border which is too rich or too wet and sour, the only remedy that can be adopted is to take the Vines up carefully and renew the border, taking care, if in a low or damp locality, to introduce a greater proportion of porous materials than before, so as to secure good drainage, and then to replant them.

Adventitious, or Air-roots, fig. 39.—These are so called from their being produced on the stem of the Vine, and their being suspended in the air like so many threads, as represented by fig. 39. They are of

the same character as the true roots, and only require to be brought into contact with the soil to become such. These air-roots are sometimes produced in great profusion from every part of the stem, frequently attaining a foot or more in length, and so give the Vine a strange appearance.

There is no particular harm in these adventitious roots, *per se*, but

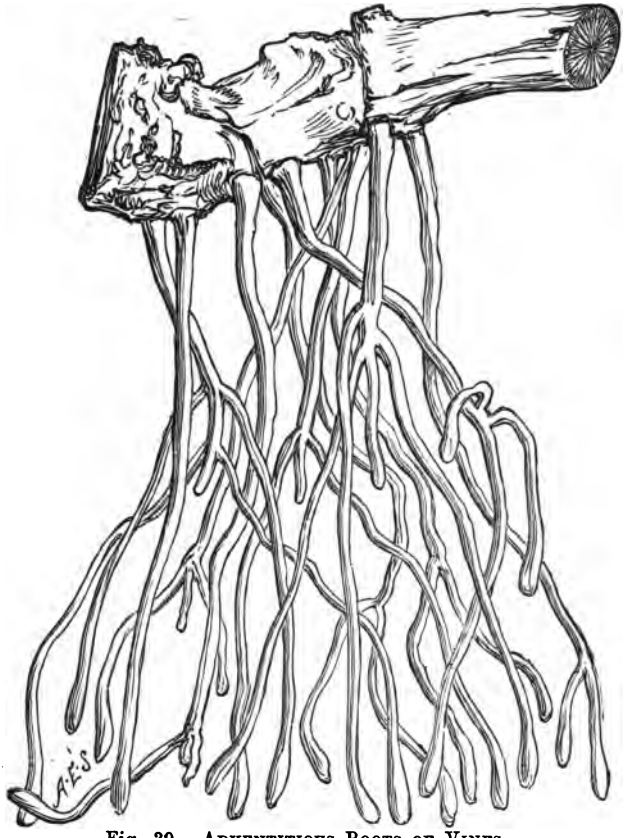

Fig. 39. ADVENTITIOUS ROOTS OF VINES.

their presence betokens a want of proper action on the part of the true roots running naturally in the soil. They are a sign of bad health, and are frequently the precursors of shanking. They give evidence that the proper roots are not in a condition to supply the great demands of a large expanse of foliage, etc, and that, aided by a warm moist atmosphere within the house, nature is trying to supply this want. Close

warmth and moisture will induce the formation of such roots from Vine-stems at any time. But if the true roots in the border are in a perfectly congenial condition, no air or adventitious roots will be produced in any ordinarily well-managed Vinery. They are, in short, the result mainly of the roots being in a cold wet border. To prevent their formation, or to recover Vines subject to this evil, the amelioration of the borders must be seen to. Some varieties of Vines, such as those of the Frontignan class, being of a more tender constitution, are more subject to the formation of air-roots than others. When they are produced, they need not be cut off, except for appearance sake, for they will wither up and die as the wood ripens.

Fungus on the Roots.—This is not of very frequent occurrence, yet it is of very serious import where it does find a footing, and should be carefully guarded against. The difficulty of dealing with it is the want of knowledge of its existence until the Vines are, perhaps, killed through its effects. The healthy Vines of one season may in the next, *when apparently in the fullest vigour*, suddenly droop and flag and die, and upon examination of the roots it is found that they are completely covered with small white threads, these being the mycelium or spawn of some fungus which has generated from decaying vegetable matter that has got into the border. The most fertile agents in producing fungi are bits of wood, especially Beech mast, or the broken stems or branches of trees. The scraps of sticks, etc., soon get covered with a mycelium in the form of what has been called Himartie, which soon spreads to living roots with which it comes in contact and soon decomposes. Plants of every kind as well as Vines suffer from it, and either become unhealthy or die; therefore, these should all be rigidly excluded in the formation of Vine borders. In some cases where it has not gone too far, pruning off the affected roots and cleansing the soil from the noxious matter is effectual in arresting its progress.

Mildew, Oidium Tuckeri, fig 40.—This is a fungoid growth upon the young leaves and fruit of the Vine. and was not generally known in this country until the year 1847. Long prior to this, however, in the year 1831 or 1832, the Rev. M. J. Berkeley observed the appearance of this mildew in the Vinery of Mr. J. Slater, of Margate, which was under the care of Mr. Tucker, and suggested to him the use of flowers of sulphur, with which he readily complied, and succeeded in driving out the pest. An account of this was given by Mr. Tucker in the *Kentish Gazette*, hence it received the name *Oidium Tuckeri*. In America it had, however, been known to exist for many years previously, although, singularly enough, the American varieties of Grapes are not much affected by it. In this country it has caused great destruction among Grapes, both in Vineries and in the open air, and in Vine-growing countries the entire season's crop is frequently destroyed by its agency.

This mildew appears to the naked eye like a little white powder only, resting on the leaves, etc., but by the aid of the magnifying glass it is seen to be a true vegetable parasitical growth, as we see it represented by the accompanying figure. It is a most insidious enemy and requires extreme watchfulness, so as to observe its very earliest appearance in order to check its progress. It vegetates very rapidly; from a small speck it will, in the course of a few days, spread over an entire house, and if not arrested in its growth, its threads will have penetrated so deeply into the tissues of the affected parts as to completely destroy them. The mildew itself may be arrested and killed, but its effects remain, the skin or cuticle of the berry being blackened and injured beyond recovery. It seems to render the berry incapable of distending further, so that it soon splits open, and is, of course, ruined. The tissues of the leaves are also injured in much the same way.

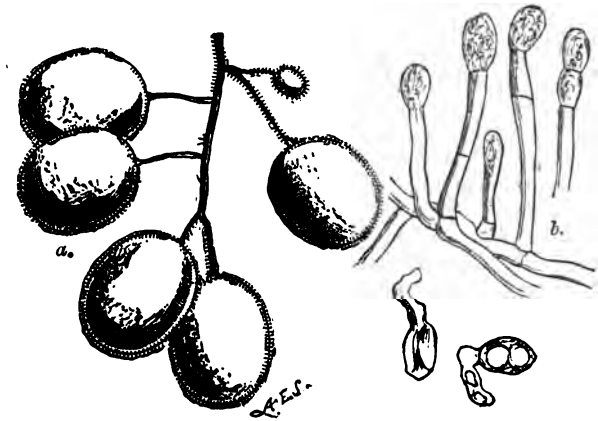

Fig. 40. *a*, MILDEW OF GRAPES; *b*, OIDIUM TUCKERI WITH CONIDIA GERMINATING (×200 dia.).

As to the causes of the Vine mildew, they are, like those of most other diseases, very difficult to trace. It is sufficient that it *does* exist. Certain atmospherical conditions are favourable to its development, as to that of all fungoid growth. There is no more fertile source than cold, damp, sunless weather, with a stagnant atmosphere, and especially if this is succeeded by bright sunshine. Of Vines grown in the open air, there is seldom a season in which they are not affected to some extent, but frequently it occurs so late in the season as practically to do but little harm.

The prevention of mildew ought, if possible, to be the chief endeavour of all Vine-growers; and in houses or vineries its inroads may almost be prevented. In the open air, it is much more difficult

to grapple with. As a stagnant atmosphere is favourable to its development, it naturally follows that one of the surest preventives is *air*—plenty of sweet fresh air—and this can be secured to a great extent by proper ventilation, and a judicious use of the heating apparatus to set the air in motion. Where this is not available, a drier atmosphere should be maintained during the cold, damp weather, avoiding all unnecessary syringing or damping.

To arrest or destroy the mildew where it has once obtained a footing many and varied means have been recommended and adopted. The most effective—indeed, the only truly effective agent—is sulphur, or certain compounds of which sulphur forms the major part. It is chiefly in regard to the method of application that the distinction between the various agents is made. Firstly, let it be noted that *the sulphur must not be ignited in any way;* that would, to a certainty, not only destroy the mildew, but also the Vines themselves. We have seen Vines so treated and so destroyed. As a preventive, or safeguard, it is not a bad method to give the hot-water pipes—not a flue—a washing or coating over with the flowers of sulphur mixed with water, or milk, which makes it adhere better, the gentle sulphurous fumes thereby arising being destructive to the mildew. Another remedial measure is to throw sulphur on lumps of fresh slaked lime, which will have a like result. The most effectual and simplest remedy of all, however, is to dust flowers of sulphur all over the Vines. This will, in the course of a few days, destroy it, when the sulphur should be immediately washed off by a forcible syringing with clear rain-water, otherwise the Grapes, being covered with sulphur, would be unfit for use. Many varieties of sulphurators for the application of sulphur have been introduced, one of the simplest being Wood's Sulphurator.

Various liquid compositions, which are applied with a syringe, have also been introduced, and are effectual in its destruction—such as the Gishurst Compound, and others—but as these frequently contain a portion of oleaginous matter, their use is not to be recommended.

Oidium Balsamii (*Montagne*). — This mildew is different in its action to that of the *Oidium Tuckeri*, and not nearly so destructive, so far as at present observed. It chiefly exists in the fleshy stalks of the bunches and berries of the Grapes, which become swollen, and so thickly covered with the mildew as to detract from their value. It only seems to make its appearance as the Grapes are becoming ripe. In the Royal Horticultural Society's Garden, at Chiswick, it has for several years been observed to attack the Gros Colman Grapes in one of the houses. No effectual means has yet been discovered of checking its progress. According to Mr. G. W. Smith, who has described this mildew in the *Gardeners' Chronicle*, it is identical with the Strawberry mildew.

American Mildew (*Peronospora viticola*) is another disease of a

similar character, which has been imported along with American Vines, and is now rapidly spreading over the Vineyards of Europe, but has not yet appeared in this country. The fungus is said to appear only on the under-side of the leaves, never on the upper, and rarely on the young stems and inflorescence.

Diphtheritis.— This disease, which seems to be either rare or of recent origin, for it is not described in any book we know, is a certain strange affection of the shoots and foliage, which — in lack of an authorised name — Mr. Blackmore, of Teddington, who has directed our attention to this malady, suggests may be termed *Diphtheritis*, or *Lorification;* for the parts attacked assume ere long the consistency of leather, and finally that of wire almost. The first symptom is a contraction of the margin of the half-grown foliage, till the leaf becomes like a cup inverted, then the stem loses its crisp, clear substance, goes dull, and is channelled with lines of shrinkage. The tips of the shoots become flat and flaccid, all the gloss is lost, and the vigour gone; and the disease descends from leaf to leaf, until the whole tissue is hardened, and the young wood becomes of a dirty black tint. The growth of the season is stopped, and the main stem, instead of gaining in bulk, is lessened.

Young Vines alone, so far as our present knowledge goes, are affected by this disorder; but they seem to take it alike whether grown in pots, or planted in their places. The roots appear to be perfectly healthy; the growth is robust and vigorous; the house has been managed as usual, there are no cold draughts, or sudden changes, defects, or excesses of temperature; but suddenly this disease appears, and Vine after Vine is afflicted.

This mainly is contagious, or, at any rate, epidemic; the symptoms seem to be distinct from all the recognised forms of mildew, and cannot be checked by the use of sulphur; yet further investigation may prove that it is of fungoid origin. Some Vine-shoots suffering from this complaint were brought before the Scientific Committee of the Royal Horticultural Society about three years since, and that learned body attributed the mischief to red-spider. Possibly the disease is akin to the Pear-blight of America, there known as the smut, the blacks, and by other local descriptions. At any rate an affection very much like it, in outward show, has been observed in recent years among young Pear-growths against walls, especially among Louise Bonne, young trees of which it has quickly killed in the prime of their summer foliage.

The only treatment we can recommend is to cut below the parts affected, remove the tainted growth from the houses, and stimulate the Vines, if they have strength left to form healthier foliage.

CHAPTER XXIV.

NOXIOUS INSECTS.

THE Vine is subject to, or becomes preyed on by, a great variety of insects, which, by their persistent attacks, destroy the vitality of the plant, if left unmolested. It is, therefore, of great importance that the Vine cultivator should become thoroughly acquainted with these pests—their general appearance and mode of life, the causes which may lead to their presence or encouragement; also the best and surest methods of preventing or guarding against their attacks, and how to destroy them when, unfortunately, they may appear. We shall now proceed to notice and briefly describe the most injurious of them.

The Red-Spider (*Tetranychus telarius*), fig. 41.—The annexed figure is a greatly-magnified sketch of this insect, which is, perhaps, the most troublesome of all, because of its being so general. There is seldom a crop of Grapes produced without some damage or other being committed by this little pest. It is so small that it is scarcely visible without the aid of a magnifying glass, yet its whereabouts is too easily recognised by the experienced cultivator. It is of a pale red colour, and spins fine webs on the leaves, chiefly on the under-side, where thousands of the insects may frequently be seen congregated, giving the leaves quite a reddish brown hue. It is this brownish or reddish appearance of the leaves which often first betrays its presence. The insects feed upon the juices of the plant, especially those drawn from the leaves, which soon assume a sickly yellow hue, and are either destroyed or rendered useless. Thus, when the red-spider is allowed to feed upon and destroy the vitality of the leaves, the result is equivalent to the absence of leaves; and without leaves there will be no eatable Grapes. The first appearance, then, of this pest should be the signal for the commencement of stringent measures for its eradication.

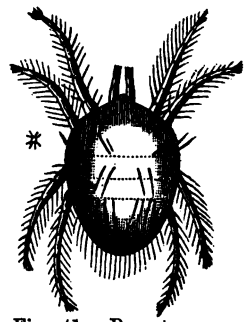

Fig. 41. RED-SPIDER (ENLARGED).

As to the causes which tend to its introduction, the chief and most fertile is dryness or aridity of the atmosphere, especially if produced by fire-heat. Dryness at the roots will also encourage its increase, and frequently it may happen that want of ventilation in hot weather will favour its development; that is, those parts of a Vinery which

are not well ventilated will be more subject to red-spider than the freely-ventilated parts. It follows, therefore—prevention being better than cure—that as dryness is the chief cause of its appearance, so moisture and water properly supplied ought to prevent it; and it is so. Hence, we may deduce the following rules:—Water freely, and keep the atmosphere at all times thoroughly moist whilst the Vines are growing, especially if the temperature be high. If these points are attended to, little injury from red-spider need be feared in the case of Vines otherwise healthy. If, unfortunately, it does obtain a footing, water must still be the chief agent with which to compass its destruction; therefore, syringe freely with clear rain-water, also apply sulphur to the hot-water pipes, or dust the leaves over with sulphur, etc.; or wash them with soapy water, with a decoction of quassia-chips, or with any compound of sulphur and soap. These remedies, applied with perseverance, will be sure to destroy it.

The Thrips (Thrips minutissima), fig. 42.—The figure shows the thrips much enlarged. It is a small, long, slender insect of a dark brown colour, sometimes pallid or almost white, which is oftentimes to be found feeding upon the Vine leaves much in the same manner as the red-spider. The thrips is, however, not so generally to be found on Vines as is the red-spider, and would rather appear to be introduced to the Vineries from other plants; but its ravages are much more severe where the insects are permitted to establish themselves, and they spread rapidly. A dry atmosphere is favourable to their increase, and in like manner water is inimical to them; but they can scarcely be dislodged or destroyed by any amount of mere syringing. It is necessary to wash the leaves with soap and sulphur, or to give them a good dressing with tobacco-powder or some insecticide, but it must be applied directly to them or it will be of little avail.

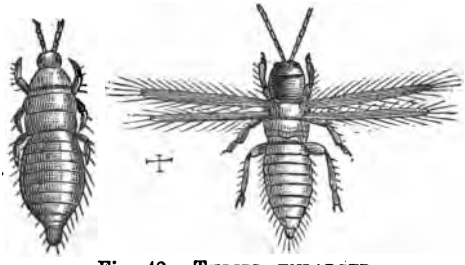

Fig. 42. THRIPS, ENLARGED.
The natural size indicated by the cross lines.

The Mealy Bug (Dactylopius adonidum), fig. 43.—This is an insect of foreign introduction, but it is now, unfortunately, very common in our plant houses. It seems to be at home on most plants, and so the Vine does not escape it. The mealy-looking substance which covers the body of the insect is an excretion, and gives rise to the name of mealy bug. Its first appearance in a Vinery ought to be rigorously guarded against, and no plant with any bug on it should ever be taken into a Vinery, for if once introduced it is scarcely

ossible to get rid of it. It increases very rapidly, and in the thick rough bark of the Vine it finds, at all times, a secure hiding place, so that in winter, be the Vines dressed ever so carefully, some individuals are almost sure to escape and spread from branch to leaf and fruit, and when on the latter they cannot be destroyed without damaging the berries. We have seen many crops of Grapes so destroyed. The course which we here recommend is to take the utmost care not to allow the insect to be introduced. To destroy it unceasing care and perseverance in dressing and washing the Vines with insecticides, such as Fir Tree Oil, or a dilution of methylated spirits or paraffin will be required.

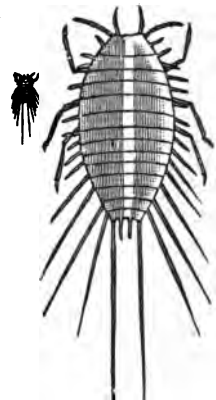

Fig. 43. MEALY BUG, ENLARGED.

The Vine Scale (*Pulvinaria or Coccus vitis*), fig. 44. — This insect is more common on the Continent on exposed Vines than in this country. It is, however, frequently to be met with in our Vineries, and is a terrible scourge, covering the stems at times, and also often appearing on the leaves and even on the fruit. The Vine scale is found in great numbers on the Continent, especially in the south, being known by its large size and the cottony exudation which denotes its presence.

Erineum.—This is a general term applied to very peculiar tufts or patches of dirty white hairs that are met with on the under surface of young Vine leaves, and which have the appearance of being of fungoid growth, but which are in reality the results of the attacks of a small mite, *Phytoptis vitis*. In some cases this is mistaken for the Phylloxera. This disease, although common in some Vine districts on the Continent, where it does considerable mischief, is not often found in our Vineries, Professor Planchon recommends, as a means of destroying it in the Vineyards, the introduction of a flock of sheep, after the Grapes are cut, to eat the Vine leaves, mites and all. In this country the only remedy is to pick off all the affected leaves and burn them.

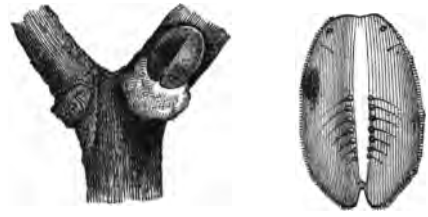

Fig. 44. VINE SCALE OR COCCUS (ENLARGED). (From the *Gardeners' Assistant.*)

The Vine Louse (*Phylloxera vastatrix*), figs. 45 to 49.—This is the most dreaded and dreadful of all the insects which attack the Vine, and has unfortunately found its way into our Vineries, in many of which it may possibly exist, unrecognised and unknown, if circum-

stances have not been favourable or the lapse of time sufficient for its development. Unfortunately, since the appearance of the last edition of VINES AND VINE CULTURE, we have made personal acquaintance with this scourge, examples of both the leaf form (fig. 49) and the root form (fig. 45*a*) having been discovered amongst some young Vines in one of the houses in the Gardens. We here quote Mr. Andrew Murray's account of it, as given in the last edition of Thompson's *Gardeners' Assistant*. This, with Mr. Worthington Smith's sketches borrowed from the *Gardeners' Chronicle*, will be sufficient to put cultivators on their guard against its intrusion, and enable them to recognise it if, unfortunately, it should make its appearance :—

"The *Phylloxeridæ* are intermediate between the scale insects and green-flies, etc.; they have the clubbed digitules on the tarsi, which are present in the *Coccidæ*, and wanting in the *Aphides*, and in their younger stages are more allied to the *Coccidæ*, while in their winged and more perfect state they are more nearly allied to the *Aphides*.

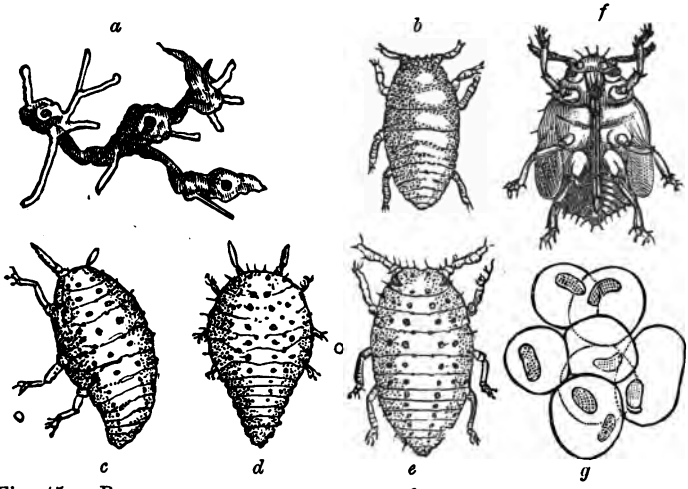

Fig. 45. PHYLLOXERA VASTATRIX, root form : *a*, portion of Vine root showing swellings and galls ; *b*, hibernating larva ; *c*, *d*, *e*, forms of more matured larvæ ; *f*, pupa of short-bodied form (fig. 48 *a*) ; *g*, vesicles found in abdomen. All the figures, except *a*, greatly enlarged.

"Within the last ten years or so a sore malady has fallen upon the Vines both in France and America, and also on the Vines in the hot-houses in this country ; and although it is not yet admitted by all naturalists to be due to the *Phylloxera vastatrix*, few entertain any doubt on the subject. The French Government has certainly entertained none, for it has offered a prize of twenty thousand francs for any remedy or preventative against its attacks. This has given rise to a flood of specifics of all kinds. The number of so-called remedies is said to have exceeded one thousand, the examination of which alone has entailed on the French officials an unheard-of amount of trouble, especially as

every remedy required to be tested on a fair and sufficient scale, and more than once. All this trouble and expense, however, has as yet been fruitless; no remedy has been found.

"In the earlier part of its cycle—for it has a cycle, as we shall presently explain—it appears under two distinct forms, both wingless, which differ, not materially, but sufficiently from each other, the one having tubercles on the back, and the other being almost without them. The former is found exclusively upon the roots, the latter on the leaves; but they have been traced going from one to the other. They are so small that they can hardly be detected with the naked eye, but under a lens are seen to be of a fleshy texture, and light yellowish brown in colour. Under this form both larvæ and females are found.

"If we examine the root and try to trace the insect, its course of life seems to be this:—It fixes itself, like the *Coccidæ*, to the root by inserting its sucker or beak into the bark of the root, and when once fixed it remains there for the rest of its life. While so fixed she lays around her, in little groups, a quantity of elliptical eggs, which are at first a fine sulphur-yellow colour, but afterwards take by degrees a smoky-gray or blackish hue, a point in which it corresponds rather with the *Aphides* than the *Coccidæ*. After about eight days a larva comes out of the egg, which resembles, except in size, the mother that laid it, but it is of a greenish yellow colour. The larva thus hatched is at first restless and agile, but at the end of three or four days it has chosen its place and fixes itself by its sucker and remains on the spot. It undergoes three moults, separated from each other by from three to five days. After about twenty days the female larva becomes adult and lays about thirty eggs; the number of generations in a year is estimated at eight, which gives a posterity of from twenty-five millions to thirty millions during a season for each individual. That is the course of life of the great majority of *Phylloxera*, but a few undergo five moults instead of three, which brings them to the superior state of insects endowed with flight. In this stage they have four wings, of which the anterior pair are transparent, but darkened as if with smoke at the end. The winged female lays its eggs in the down of the young leaves and buds, and the eggs that it lays are larger and in fewer number than those of the apterous females on the roots, and they are of two sizes, of

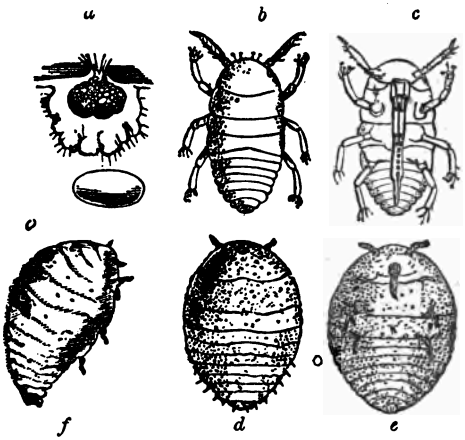

Fig. 46. PHYLLOXERA VASTATRIX, leaf form: *a*, section of leaf gall; *b*, *c*, larvæ newly hatched; *d*, upper view; *e*, under view; *f*, side view of the mother gall louse. All the figures, except *a*, greatly enlarged.

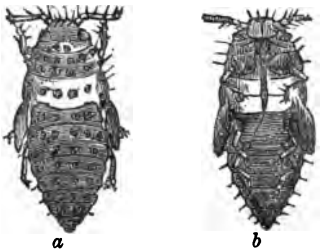

Fig. 47. PHYLLOXERA VASTATRIX, wingless female; *a*, upper surface; *b*, under surface. Greatly enlarged.

which the largest are female eggs and the smaller males. But the insects which issue from them are remarkable in more respects than one. From the female eggs are produced females without wings, and equally males without wings from the male eggs. They are incapable of feeding, for neither has a sucker. From these males and females proceed a fresh laying of eggs, or rather of egg, for the female only lays one solitary egg, which is not yellow, but more or less of a sombre green, and is very difficult to perceive on the bark, where it is fixed by a small hook. It passes the winter thus, and in spring a wingless individual is hatched exactly resembling those on the roots, but with a very long sucker. This vernal individual is very fertile, containing from twenty to twenty-four ovaries or reservoirs full of eggs. Its descendants produce eggs without the intervention of males, some of them fixing themselves on the leaves and producing galls (figs. 45 and 46), the others reaching the roots and renewing the

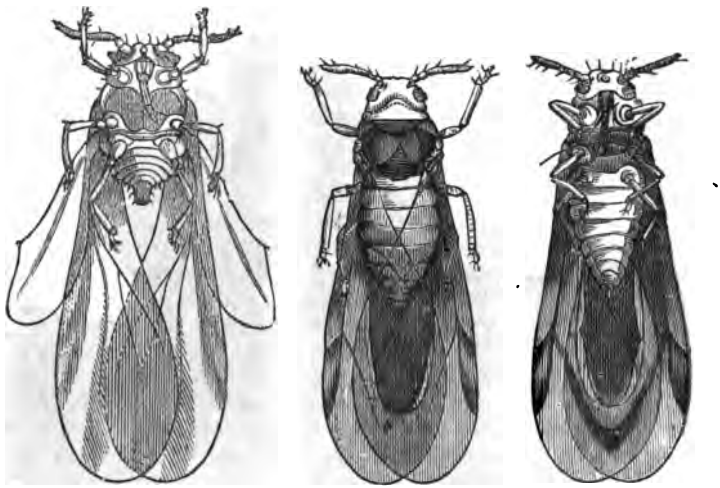

Fig. 48. PHYLLOXERA VASTATRIX: *a*, Imago of short-bodied root form, formerly supposed to be the male; *b*, winged female, upper surface; *c*, ditto, lower surface. Very greatly enlarged.

subterranean race. How long the race may be propagated in this way, without the intervention of the sexual males and females above spoken of, is not known. But as the continual renewal of the race proceeds, each brood becomes less and less fertile, by a reduction in the number of the egg-bearing tubes or ovarian reservoirs. The winged female, fertile without the intervention of a male, only lays a small number of eggs—from four to ten. At last the progress ends by the sexual female having no more than a single ovarian reservoir and a single egg, which will be sterile if there is no male to fertilise it. In this way the single egg which terminates the Phylloxerian cycle is reached.

"The above is the account given by Professor Balbiani and Professor Maurice Girard of the evolution of the *Phylloxera*. Whether their views are well founded or not remains to be seen. They are the authors who have paid most attention to the subject, and to whose opinion much weight is attached. Their solution of

the problem how to destroy the *Phylloxera* is to kill the winter egg deposited on the cane by smearing the cane with coal-tar or any other suitable means, since it is that egg that renews the generations that attack the roots. It may not be so easy to do so in the open air in France, but in our Vineries we ought to be able to do so more easily (always supposing their hypothesis to prove well founded), first by examining anatomically and microscopically the specimens found, and seeing from the number of their ovarian tubes whether the broods of young are far advanced in the cycle, and likely soon to be reduced to the single egg that renews it; and if so, to take special precautions against it, which ought to be the more easy to do, as it is said always to be laid on the cane, and never on the bud or the leaves."

Fig. 49. VINE LEAF INFESTED WITH PHYLLOXERA.

(From the *Gardeners' Chronicle.*)

Many remedial measures have been, as stated, from time to time suggested for the destruction of this terrible scourge, but as yet without any practical result. M. Dumas, the Secretary of the French Academy of Sciences, suggested and tried several chemical mixtures, some of which proved excellent manures, and were also injurious to the louse; but, although the insect may be killed or destroyed by it, there is the further and greater difficulty of applying it to the Vines under cultivation. Water is the only vehicle by which anything can reach the roots of the plant; and, so far, water where it can be applied in quantity and for a long time so as to suffocate the insect. has proved efficacious in destroying this pest. It has been noted that in nearly every instance the insect has only existed in warm and, probably, dry inside borders. In moist or outside borders, where abundance of water has been supplied, little or no *Phylloxera* has existed in this country. Mr. Dunn, of Dalkeith, when gardener at Powerscourt, near Dublin, was the first of our horticulturists to succeed in eradicating the pest, and he did so by "stamping it out," that is, by taking up all the Vines from the Vinery, removing the earth, thoroughly cleansing every portion, and then restocking with fresh Vines and fresh earth. The following method was adopted at Chiswick. The house being closely shut up, sulphur was burnt until every plant was killed by the burning fumes, then the plants were burned, and every bit of soil, also the drainage, carted away, and the whole of the framework of the house repainted, this proved absolutely successful, and has been followed by others with equal success. Bi-sulphide of carbon has been tried successfully, but this is found to be too expensive for general cultivation. In many of the French Vineyards grafting on various kinds of American Vines has been tried largely and with success; the insect feeds on the roots of the American Vines, which being more robust, do not suffer so severely by its attacks as the European Vines.

Of other Insect Pests, happily not very familiar in this country, but which have been known to do great damage in many Vineyards on the Continent, we may notice the following:—

The Vine Beetle (*Lethrus cephalotes*).—This somewhat resembles the common dung beetle. It is, according to Kollar, very common in the southern parts of Hungary. It issues from the earth in spring, when the Vine has begun to shoot, creeps upon the branches, bites off the leaf and flower-buds, and carries them back to the opening through which it left the earth. The only way to protect the Vine from this enemy is to catch each one individually and kill it, and this can easily be done, as it carries on its work by daylight.

The Vine Weevil, fig. 50 (*Cucurlio vitis*), otherwise *Otiorhynchus sulcatus*, otherwise *Otiorhynchus vastator*; and its smaller and less common congener, *Otiorhynchus picipes*.—The former is of a dull black colour, hard, round-bodied, granulated, wingless, having six

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legs, a blunt proboscis, and two antennæ. Its length is about three-eighths of an inch, and its habits are nocturnal. The larvæ are of a dull white colour, legless, curved, and maggoty in appearance, and seem to have a gregarious tendency. The pupa is soft, of a dirty white tone, and more sensitive than pupæ are in general.

Fig. 50. THE VINE WEEVIL. *Curculio vitis.*

In the larva state, living wholly underground for a period not yet ascertained, this creature feeds upon the Vine roots, and gnaws them almost to a stump, enjoying especially the out-push of young fibres, and following every tender growth. This is the most destructive stage. Then, after about a fortnight passed in the grub state, the weevil issues from the soil, and for several weeks, perhaps, feeds upon the foliage by night, and lurks about the neighbourhood by day.

To strong and well-established Vines this pest may not do much injury; to newly-planted canes and those in pots it is often fatal. There seems to be no remedy—for who can remove and burn the soil, as is lightly recommended, without destroying the Vine roots too?—except to catch the marauder in his nightly raid, and check the breed. This is done by laying white cloths or paper under the Vine stems, and throwing a bright light on them. Any weevils which do not drop, as some will do at the surprise, may generally be brought down by a sharp shake of the trellis. By frequent care of this throughout the spring and early summer, the plague may be stayed, though nothing will entirely quell it, when once set up. Above all permit no pot plants, such as Ferns, Spiræas, etc., of tufty and thickety nature to stand near the Vines in spring-time. In these the weevils harbour, and pursue their evil courses; then the female descends the pot, and the Vine roots support her issue.

Mr. R. D. Blackmore, of Teddington, who has kindly furnished the foregoing description, has had his Vines greatly injured by this pest.

The Vine Tortrix or Moth (*Tortrix vitisana*), fig. 51.—This, according to Kollar, is a moth from the caterpillar of which the Vines in the neighbourhood of Vienna have suffered much, and it is occasionally met with in this country. Boisduval, when speaking of

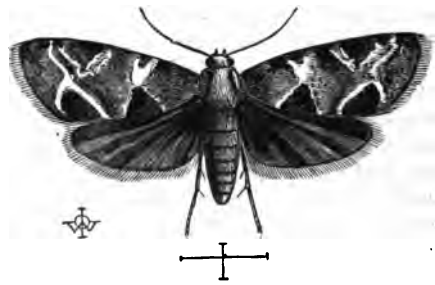


Fig. 51. TORTRIX VITISANA. The crossed lines indicate the natural size. (From the *Gardeners' Chronicle.*)

the ravages of this insect, exclaims, "Dieu merci, il n'a pas encore fait son apparition en France." The female, early in spring, lays her eggs singly on the twigs or buds of the Vine, from which the young are hatched at the time when the blossom-buds are unfolded. These caterpillars fasten several blossom buds together, and eat off the inner parts of the flowers. When one part is finished they go on to another, and so destroy a great quantity. Instances have occurred in which though plenty of blossom has appeared, the whole crop has been devoured by these caterpillars.

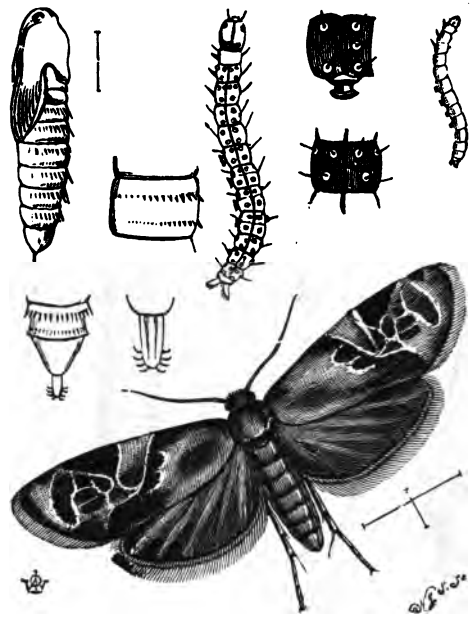


Fig. 52. TORTRIX ANGUSTIORANA. The crossed lines indicate the natural size. (From the *Gardeners' Chronicle.*)

Another Vine moth—*Tortrix angustiorana*, fig. 52, has recently been figured and described by Mr. Westwood in the *Gardeners' Chronicle*, N.S. xviii., 524. This moth seems to have existed in America for some few years, but it is only lately that its appearance has been noticed in this country. The caterpillars are found gnawing the skin of ripe Grapes, eating a little of the pulp, and fastening them together by a web, thus destroying much fruit. They are about one inch in length, of a dirty greenish grey colour, with a dark line down the middle of the back. The head is pale buff, very glossy and nearly square; the

eyes black. We have captured several of the caterpillars of this moth in the great vinery at Chiswick, where they were found preying on the ripe fruit. They appear to feed on one berry, which decays

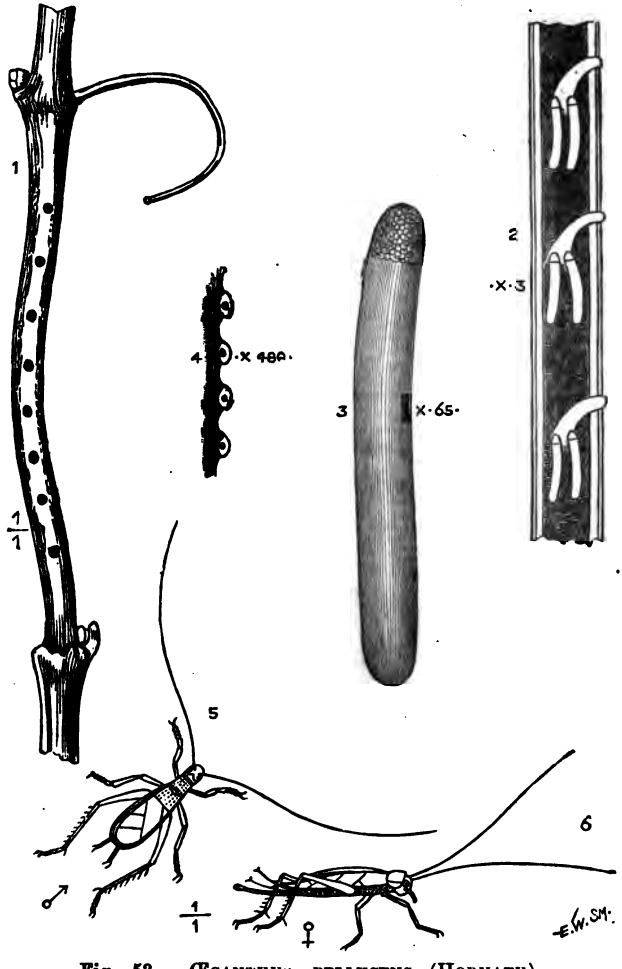


Fig. 53. Œcanthus pellucens (Horvath).

and rots the adjoining ones, so that four or five berries are often found to be destroyed; consequently, they prove to be very destructive. They may easily be found, and when disturbed, like all these

insects, they drop suddenly from their quarters suspended by a small web. Other species of Tortrix, or Vine moths, have been observed, which bear a great resemblance to those noticed in their manner of life.

Œcanthus pellucens.—This is a sort of cricket, pretty common in the vineyards of Hungary, which has been brought under our notice by Herr Horvath, of Funfkirchen, Hungary, a very zealous amateur cultivator of Grapes. It is entirely unknown in this country, and it was only in 1883 that the exact habits of the insect were discovered by Dr. G. Horvath, of Buda-Pesth. The illustration, fig. 53, we copy from the Hungarian Entomological Journal, *The Rovartani Lapok*, 1884, where it is fully described by Dr. Horvath. The insect lays its eggs in the pith of the young shoots of the young growing Vine. Their presence may be easily detected on the exterior by the small round holes made in the (1) shoot; and on splitting the shoots carefully, the eggs (2) are plainly visible. Herr Horvath states that this insect is much beloved by the peasantry on account of its song, or chirp, which it utters at twilight, from the beginning of July until late in the autumn. Their fondness for it arises, not only from its pleasant sounding chirp, but also from the fact that it begins when the Grapes are just beginning to colour, and so heralds the vintage.

CHAPTER XXV.

SELECTIONS OF GRAPES FOR SPECIAL PURPOSES.

IT would be practically impossible in any one establishment to cultivate all the varieties of Grapes which are known, or even all those which are known to possess some special merit. We have, therefore, thought it desirable to indicate in a condensed and collected form a selection of the varieties best adapted for particular purposes—

"Many for many virtues excellent,
None but for some, and yet all different."

I.—Grapes for Pot Culture.

1. Black Hamburgh
2. Royal Muscadine
3. Foster's Seedling
4. Madresfield Court
5. Royal Ascot
6. Black Alicante.

For this purpose no Grape equals No. 1 (the Black Hamburgh), which is grown to a hundred times the extent of any other, and is the *beau ideal* of a Pot Grape; No. 2 is much esteemed for earliness and certainty of cropping; Nos. 4 and 6 produce handsome bunches; No. 5 is very free-fruiting.

All the early Sweetwaters are also particularly well suited for cultivating in pots. The Muscat of Alexandria and some others of the high-class Grapes are, on the contrary, very unsatisfactory.

II.—Grapes for Open-air Cultivation.

1. Royal Muscadine
2. Chasselas Vibert
3. Ascot Citronnelle
4. Black Hamburgh
5. Miller's Burgundy
6. Espiran.

No. 1, the Royal Muscadine, very generally grown as the Sweetwater, and in France as the Chasselas de Fontainebleau, is the best open-air Grape, ripening freely in warm situations in the south of England; No. 2 is earlier than No. 1, and larger in berry, a variety greatly to be desired; No. 3 is early and of fine quality; No 4 in fine seasons ripens pretty well; Nos. 5 and 6 ripen freely in fine seasons. The old Dutch Sweetwater is sometimes excellent, but frequently sets badly. Black July and Miller's Burgundy may also be recommended.

III.—Grapes for a Greenhouse.

1. Black Hamburgh
2. Royal Muscadine
3. Madresfield Court
4. Foster's Seedling.

These will ripen freely in an ordinary greenhouse without requiring any fire-heat or special attention.

IV.—Grapes for Cultivation by Amateurs.

1. Black Hamburgh
2. Madresfield Court
3. Foster's Seedling
4. Royal Muscadine
5. Alicante
6. Muscat of Alexandria.

These are all of excellent constitution, free-bearing, good in quality and of fine appearance; No. 6 (the Muscat of Alexandria) requiring special treatment in respect to more heat, etc.

V.—Grapes grown for Market or Sale Purposes.

1. Black Hamburgh
2. Gros Colman
3. Muscat of Alexandria
4. Canon Hall Muscat
5. Alicante
6. Lady Downe's Seedling
7. Madresfield Court
8. Buckland Sweetwater.

Appearance, size, and free-fruiting qualities are the chief requirements for market Grapes. No. 1 may be noted as the leading market Grape; No. 2, from its great size, handsome appearance, and good keeping properties, is now the chief and most profitable late Grape grown; No. 3, when well grown, is always in demand; No. 4 is one of the most profitable when well cultivated; Nos. 5 and 6 are free-fruiting and keep well; No. 7 is valuable as an early variety of fine quality, also No. 8 from its size and fine appearance. Foster's Seedling and Duke of Buccleuch are sometimes seen in small quantities. Very few other sorts are ever seen in market.

VI.—Grapes for Exhibition.

The best six Black varieties for exhibition purposes :—

1. Black Hamburgh
2. Alicante
3. Madresfield Court
4. Gros Guillaume
5. Gros Colman
6. Alnwick Seedling.

The best four White varieties for exhibition purposes :—

1. Muscat of Alexandria
2. Trebbiano
3. Buckland Sweetwater
4. Foster's Seedling.

The most imposing of the Black Grapes is, no doubt, the Alicante, and among the White varieties the Muscat of Alexandria.

VII.—Grapes for Late Keeping.

BLACK GRAPES.

1. Gros Colman
2. Lady Downe's Seedling
3. Mrs. Pince
4. Alicante
5. Alnwick Seedling
6. Gros Guillaume
7. West's St. Peter's.

No. 1 occupies the premier position for keeping properties; No. 2 is nearly equal; No. 3 holds its flavour well, but often loses colour and shrivels rather than rots; No. 4 is very popular for its fine appearance; No. 7 retains the greatest freshness, but when kept late becomes of inferior quality.

WHITE GRAPES.

1. Muscat of Alexandria
2. White Tokay
3. Trebbiano
4. Raisin de Calabre.

Late White Grapes are not nearly so much in repute as the Black sorts; they are so easily bruised and disfigured that they are difficult to send to market in good condition.

VIII.—Grapes for Early Forcing.

1. Black Hamburgh
2. Madresfield Court
3. Duke of Buccleuch
4. Royal Muscadine
5. Foster's Seedling
6. Ascot Citronelle.

No Grape forces more easily, or is more generally useful than No. 1, which can always be relied upon; No. 2 is now recognised as a good early variety; No. 3 is large and handsome, and ripens before the Black Hamburgh; Nos. 4, 5, and 6 are all excellent as early sorts.

IX.—Grapes of the Highest Quality.

1. Muscat of Alexandria
2. Chasselas Musqué
3. Grizzly Frontignan
4. Duchess of Buccleuch
5. Ferdinand de Lesseps
6. Muscat Champion
7. Duke of Buccleuch.

Amongst these No. 1 is decidedly first, being the best and handsomest of all Grapes; No. 2 is very luscious, but its habit of cracking spoils it; No. 3 is rich but not attractive; No. 4 is exceedingly rich; No. 5 has a peculiarly pleasant richness; No. 6 is large and luscious; No. 7 is very large and most refreshing in quality.

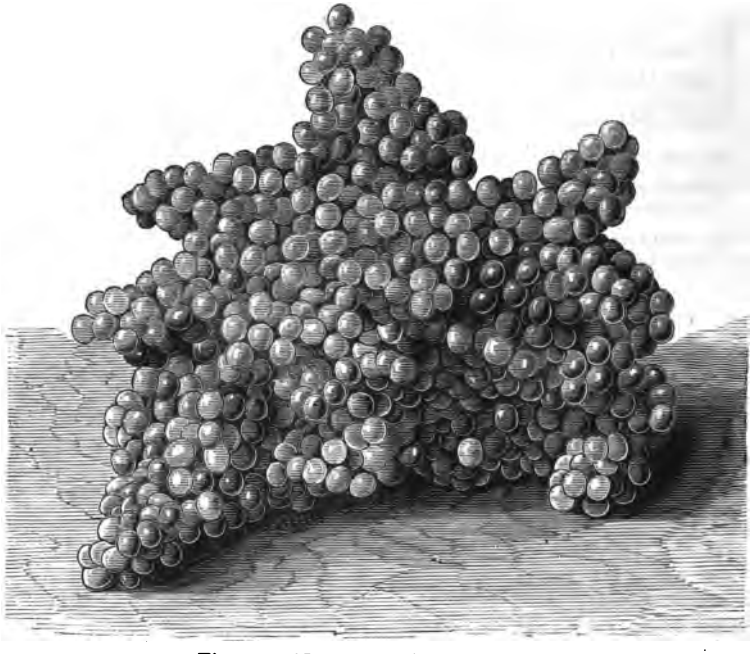


Fig. 54. Mr. Curror's Trebbiano.

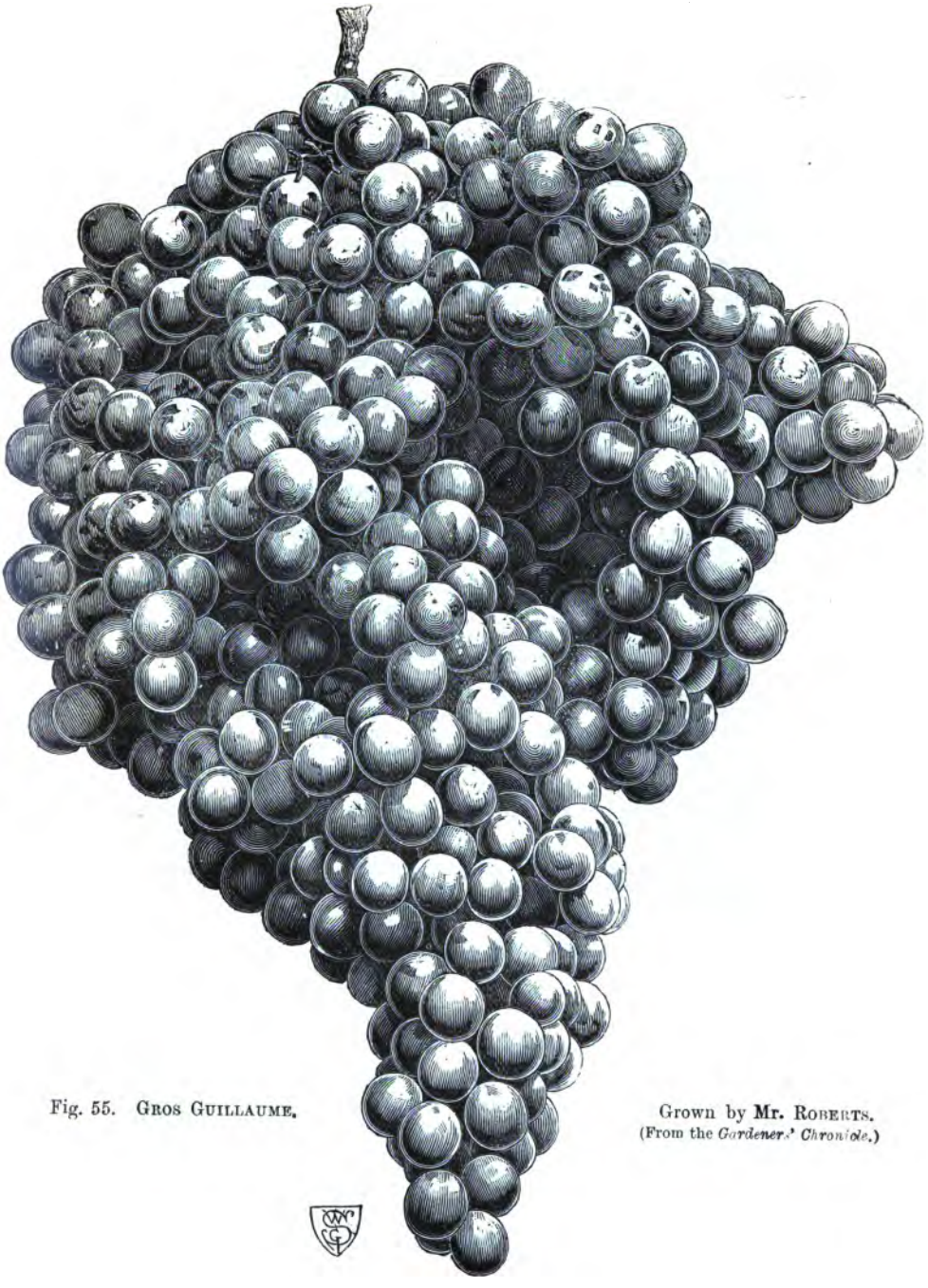


Fig. 55. GROS GUILLAUME.

Grown by **Mr.** ROBERTS.
(From the *Gardeners' Chronicle.*)

X.—Grapes Producing the Largest Bunches.

1. Trebbiano: The largest bunch on record is that which was grown by Mr. Curror, at Eskbank, on a Vine of this variety, weighing twenty-six pounds four ounces (fig. 54).
2. White Nice: Bunches reputedly of this sort have been grown at Arkleton weighing twenty-five pounds fifteen ounces, and nineteen pounds five ounces; and from Castle Kennedy weighing seventeen pounds two ounces.
3. Gros Guillaume: the late Mr. Roberts, Charleville Forest, Ireland, grew the largest bunches of this variety, one of which weighed twenty-three pounds five ounces. *See* fig. 55.
4. Syrian: Speechly's famous bunch of this variety, grown at Welbeck, weighed nineteen pounds.
5. Black Hamburgh: Mr. Hunter, of Lambton, exhibited one bunch of this, weighing twenty-one pounds twelve ounces, and another weighing thirteen pounds two ounces, these being the largest on record of this variety.

XI.—The Largest Berried Grapes.

1. Gros Colman: berries four inches in circumference are recorded
2. Canon Hall Muscat: berries three-and-a-half to four inches in circumference
3. Duke of Buccleuch
4. Waltham Cross
5. Mill Hill Hamburgh
6. Dutch Hamburgh
7. Muscat Champion.

XII.—Grapes of Peculiar Interest.

1. Black Corinth: produces the Currants of commerce
2. Black Monukka: seedless, with crackling flesh of singular but agreeable flavour
3. Strawberry: ripe fruit perfumed and scenting the air as with ripe Strawberries or Raspberries
4. Ferdinand de Lesseps: peculiarly delicate flavour, highly perfumed
5. Ciotat: leaves very much laciniated, hence called the Parsley Vine
6. Aleppo: fruit striped or part-coloured.

Several varieties of Grapes are remarkable for the handsome colour assumed by their foliage in the autumn months.

CHAPTER XXVI.

THE CLASSIFICATION OF GRAPES.

THE varieties of Grapes are so numerous—a large proportion of them nearly, if not quite, unknown, and so unsuitable also for cultivation in this country, being mainly used for wine making—that it is not desirable, even were it possible, to attempt here a complete enumeration of them. We shall, therefore, confine ourselves to noticing such of the different varieties that are or have been grown in this country, and are distinct, or possess some special merit.

In a broad sense, the cultivated varieties of the Grape Vine are divisable into two great families or classes, which are very distinct, not only in constitution, but also in foliage and fruit. These are:—

I. The EUROPEAN GRAPES, including all cultivated Grapes of the Old World, and consisting of varieties of *Vitis vinifera.*

II. The AMERICAN GRAPES, including those belonging to America or the New World, consisting of varieties of *Vitis Labrusca.*

There has been no very definite classification of Grapes yet adopted, although the desirability of employing some simple and popular method of grouping the different varieties, whereby those who have only a limited knowledge of the subject may comprehend something of the nature and character of the variety named, is self evident, and the want of it has been long felt. It will be at once admitted that the terms Muscat and Sweetwater are pretty well understood, as conveying a knowledge of the flavour and general character of the respective varieties to which they are attached; and it is by an extension of this idea that we propose to arrange them into three great classes or sections, characterised by the flavour of the fruit—

§ 1. Sweetwater Grapes.
§ 2. Muscat Grapes.
§ 3. Vinous Grapes.

These principal sections may be subdivided, firstly by the colour of the fruit, which may be—

Black or Purple,
White, Green or Yellow,
Red or Tawny;

and secondly, by the shape of the fruit, which is—

Oval,
Round;

thus making in all, when complete, eighteen well marked sub-divisions.

By this plan, one would be enabled to speak of the Chasselas Musqué, for example, as a Round White Muscat Grape; of the Black Hamburgh, as an Oval Black Sweetwater Grape; and of the Gros Colman, as a Round Black Vinous Grape, etc.

Class 1.—EUROPEAN GRAPES (*Vitis vinifera*).

§ 1. Sweetwater Grapes.

Varieties with a sweet sugary or saccharine flavour, the juice thin, but pleasant, varying in sweetness; skin generally thin and tender. These are mostly early varieties, and ripen freely. Those termed Muscadines are here included, as well as the greater portion of what the French term Chasselas.

* *Berries Black or Purple.*

† Oval.

1. Black Hamburgh or Frankenthal
2. Black Monukka
3. Black Prince
4. Œillade Noire
5. Trentham Black.

†† Round.

6. Black July
7. Black Muscadine
8. Black Corinth
9. Miller's Burgundy
10. Mill Hill Hamburgh

** *Berries White, Green, or Yellow.*

† Oval.

11. Bicane
12. Cabral
13. Chaouch
14. Diamant Traube
15. Foster's Seedling
16. Grove End Sweetwater
17. Golden Champion
18. Lady Hutt
19. Madeleine Royale

†† Round.

20. Buckland Sweetwater

†† Round—*continued.*

21. Chasselas de Florence
22. Chaptal
23. Chasselas Vibert
24. Ciotat
25. Duke of Buccleuch
26. Dutch Sweetwater
27. Golden Hamburgh
28. Prolific Sweetwater.
29. Royal Muscadine
30. White Frankenthal

*** *Berries Red, Tawny or Variegated.*

† Oval.

31. Ahbee.

†† Round.

32. Aleppo

†† Round—*continued.*

33. Chasselas Rose
34. Chasselas Violet
35. Gromier du Cantal
36. Lombardy.

§ 2. Muscat Grapes.

Varieties with a musky or perfumed flavour, and generally with firm flesh. The larger varieties, as a rule, require a warmer temperature to ripen in than the Sweetwaters. The Frontignans are included amongst the Muscats.

* *Berries Black or Purple.*

† Oval.

37. Ingram's Hardy Prolific
38. Madresfield Court
39. Muscat Hamburgh
40. Mrs. Pince

†† Round.

41. Angers Frontignan.

†† Round—*continued.*

42. August Frontignan
43. Black Frontignan
44. July Frontignan
45. Muscat de Lierval
46. Meurthe Frontignan
47. Sarbelle Frontignan.

** *Berries White, Green or Yellow.*

† Oval.

48. Ascot Citronelle
49. Canon Hall Muscat
50. Ferdinand de Lesseps
51. Golden Queen
52. Muscat of Alexandria
53. Muscat of Hungary
54. Muscat Bifère
55. St. Laurent

†† Round.

56. Ascot Frontignan
57. Auvergne Frontignan
58. Chasselas Musqué
59. Dr. Hogg
60. Duchess of Buccleuch
61. Mrs. Pearson
62. Ottonel
63. Trovéren Frontignan
64. White Frontignan.

*** *Berries Red or Tawny.*

† Round.

65. Grizzly Frontignan.
66. Madeira Frontignan.
67. Muscat Champion.

§ 3. Vinous Grapes.

Varieties with a strong vinous—somewhat harsh—semi-saccharine flavour, and a thick skin, mostly requiring a considerable amount of heat and time to ripen, are generally termed late Grapes.

* *Berries Black or Purple.*

† Oval.

68. Alicante
69. Alnwick Seedling
70. Appley Towers
71. Black Morocco
72. Gros Maroc
73. Morocco Prince
74. Royal Ascot
75. West's St. Peter's.

†† Round.

76. Aramon
77. Dutch Hamburgh
78. Espiran
79. Gros Colman
80. Gros Guillaume
81. Lady Downe's Seedling.

** *Berries White or Yellow.*

† Oval.	†† Round.
82. Royal Vineyard	88. Raisin de Calabre
83. Syrian	89. White Gros Colman
84. Trebbiano	90. White Lady Downe's Seedling
85. Waltham Cross	91. White Nice.
86. White Lisbon	
87. White Tokay.	

Class 2.—AMERICAN GRAPES (*Vitis Labrusca*).

These are generally slightly perfumed, and are in favour more or less "foxy," with a peculiar gelatinous flesh.

* *Berries Black or Purple.*

92. Brighton	94. Strawberry.
93. Moore's Early	

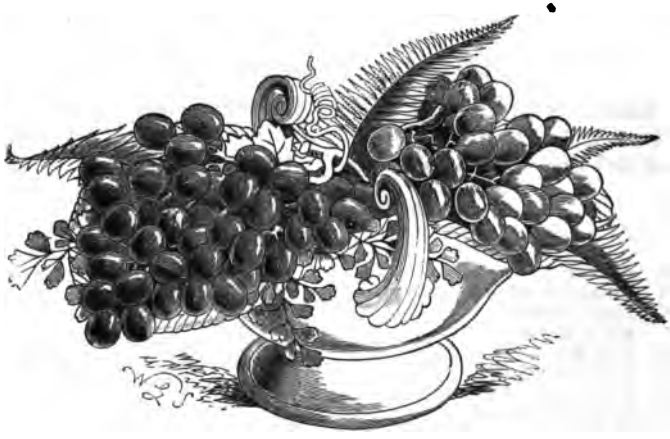
** *Berries White or Golden.*

95. Eldorado	97. Lady
96. Golden Pocklington	98. Lady Washington.

*** *Berries Red or Grizzly.*

99. Jefferson	100. Virginius.

This synopsis of select varieties includes all the Grapes at present known which, on some ground or other, we think deserving of attention, though for general utility, as shown in Chapter XXV., the number of sorts may be reduced within much narrower limits.



CHAPTER XXVII.

THE VARIETIES OF EUROPEAN GRAPES.

THE varieties of European Grapes included in the synoptical list given in the foregoing chapter have now to be described; and in order to do this we have thought it best to arrange them in alphabetical order for facility of reference, and have added such particulars of the history of the several kinds, and such cultural notes as may be likely to prove useful and interesting.

ABERCAIRNEY.—West's St. Peter's.

AHBEE (31*). — An oval tawny or grizzly Sweetwater Grape. *Season:* late; improved by hanging after being ripe. *Merits:* quite third-rate in quality, but exceedingly handsome in appearance; but scarcely worthy of cultivation.

VINE.—*Growth* very strong and robust, producing large thick wood, which does not always ripen freely; moderately fruitful. *Leaves* large, thick, deep green, and broadly serrated. *Leaf-stalks* reddish.

FRUIT.—*Bunches* large, averaging from ten inches to twelve inches in length when well grown, and weighing from one pound to three pounds, of regular tapering form, with large shoulders. *Foot-stalks* thick and strong. *Berries* large, roundish oval, always well set. *Skin* thin; at first of a dull greenish colour, changing when fully and properly ripened to a bright rosy pink on the side next to the sun. *Flesh* somewhat soft and squashy, and without flavour.

HISTORY, ETC. — The Grape—as its name, Ahbee, which means "watery," indicates—is a native of India. It was sent to the Horticultural Society in 1836 by Colonel Sykes, from the Deccan (India). It formed one of the first collection of Grapes planted in the great conservatory at Chiswick, where its merits were fully tested in 1861-62. Its very handsome appearance gained for it considerable popularity; one facetious writer describing it as peculiarly suitable for wedding breakfasts, alluding to the beautiful blush colour of the berries.

CULTURAL NOTES.—There is no record of its successful cultivation elsewhere than that at Chiswick, already referred to. The plant there, which fruited so well, was grown in a very shallow inside border, where the roots were much confined; other plants in good soil proved unsatisfactory. It sets freely, but requires a considerable amount of heat to ripen it thoroughly.

ALEPPO (32)—A round variegated Sweetwater Grape. *Season:* early; fit only for immediate use. *Merits:* quality third-rate; worthy of cultivation for its singular appearance.

SYN. —*Chasselas Panaché.*

VINE.—*Growth* somewhat slender, producing small wood, which generally ripens freely, and is provided with large prominent buds; fruitful. *Leaves* medium sized, roundish, deeply serrated, with a reddish tinge, sometimes striped red and yellow in a singular manner.

* The numbers refer to the Synoptical List at page 124.

FRUIT.—*Bunches* small or medium sized, somewhat loose and straggling, with slender stalks. *Berries* below medium size, round, variously coloured, some being green, others black, or striped with black and red; frequently a bunch may be all of one colour, or one-half black and the other green. *Flesh* soft, of a sweet and pleasant flavour, but having no particular character.

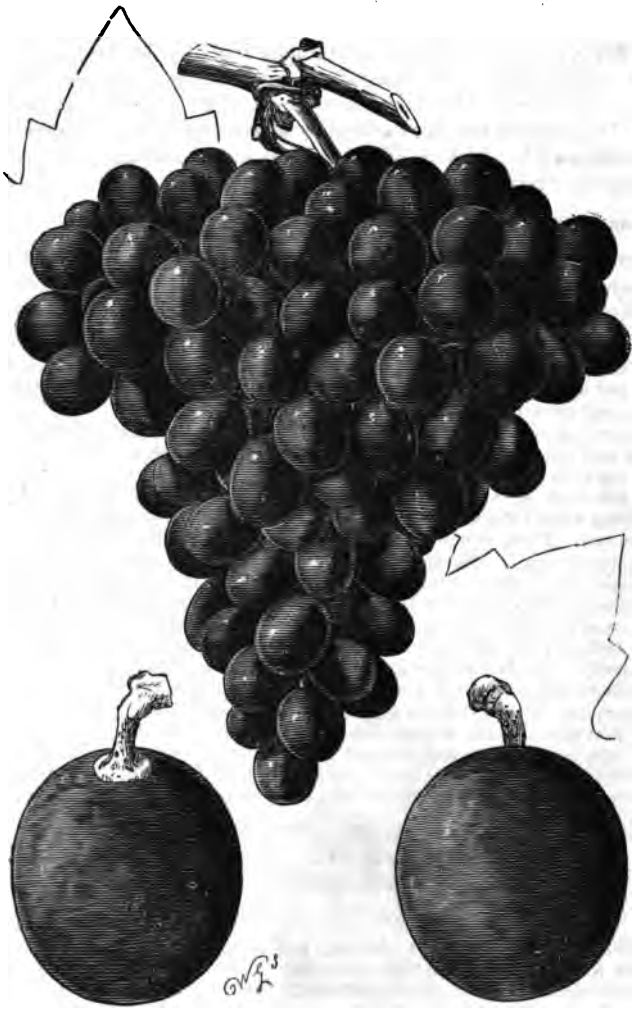


Plate I.—ALICANTE.

(Bunch ½; berries natural size.)

HISTORY, ETC.—This appears to be a very old variety, and is known throughout France and Germany. Most probably it is the result of a sport. It has been frequently submitted to the Fruit Committee as a new variety.

CULTURAL NOTES.—Has the reputation of requiring heat, but we believe it will succeed in any ordinary Vinery.

ALICANTE (68)—Plate I.—An oval black Vinous Grape. *Season:* best suited for late use; where Grapes are required after Christmas, there are few sorts that keep so well as the Alicante. It is largely cultivated for market. *Merits:* quality third-rate, but valuable for its excellent keeping and free-fruiting properties, its splendid appearance and fine constitution.

SYN.—*Black Alicante, Black Lisbon, Black Portugal, Black St. Peter's, Black Spanish, Black Tokay, Meredith's Alicante, etc.*

VINE.—*Growth* very strong, vigorous and free; the young growing shoots densely coated with down, giving them a whitish appearance, the ripened shoots being also downy, and especially so round the buds, which are large and prominent, and of a dark purplish colour; the wood ripens freely and well; moderately fruitful. *Leaves* very large, deep green, thick and soft, covered with down on the under side, giving them a silvery appearance; they remain long conspicuously green amongst others, being late in ripening and changing colour, and die off yellow, or occasionally tinged with red.

FRUIT.—*Bunches* large, or very large, averaging from two pounds to six pounds in weight, broadly shouldered, sometimes regularly tapering and of very handsome form, but more frequently divided, or with large irregular shoulders that assume the appearance of a cluster of bunches; always very closely and well-set, and requiring very early attention in regard to thinning. *Stalk* stout, strong, and very short, the bunch frequently resting on the shoot. *Berries* large, of a true oval shape, quite black, and covered with a dense blue bloom. *Foot-stalks* thick, short, and slightly warted. *Skin* thick and leathery. *Flesh* rather squashy, with a tinge of red, and adhering to the skin. *Flavour*, in general, somewhat earthy and disagreeable, but when well ripened, and after hanging a long time, they are more briskly and pleasantly flavoured, although seldom rich.

HISTORY, ETC.—There is no authoritative record of the introduction of this Grape. The name is Spanish, but it is applied to several varieties of Grapes coming from Spain. Dr. Hogg (*Fruit Manual*) states that he has met with it in the Vineyards of the south of France, under the name of *Espagnin Noir*. It is no doubt the same as *Speechley's Alicante*, but it is to Mr. Meredith, late of Garston Vineyard, that the credit for the popularity of this Grape is due. His excellent and extensive cultivation of it led to its being called *Meredith's Alicante*, in order to distinguish it from Kempsey Alicante, at that time much praised and recommended, but which ultimately proved to be Black Morocco.

CULTURAL NOTES.—There are very few better constitutioned, or more easily cultivated Grapes. It will grow and succeed in any ordinary Vinery, but the more heat that is given to ripen the fruit, the better the flavour. With ordinary care, it is generally very fruitful, always sets well, and colours magnificently. After ripening it requires to be kept in a cool temperature, otherwise the berries are apt to rot and decay.

ALNWICK SEEDLING (69)—Plate II.—An oval black Vinous Grape. *Season:* late. *Merits:* quality second-rate, but valuable as a late variety; it is one of the best keeping Grapes in cultivation, and extremely handsome.

SYN.—*Clive House Seedling, John Downie.*

VINE.—*Growth* very strong, robust, and vigorous, producing long-jointed wood, remarkably free constitution; very fruitful, the young growing shoots nearly

Plate II.—ALNWICK SEEDLING.
(Bunch ½; berries natural size.)

smooth, reddish in colour; the ripened wood firm, with reddish brown bark, and large prominent buds. *Leaves* very large, bright green, rugose, deeply serrated, and dying off yellow.

FRUIT.—*Bunches* large, with one very large shoulder, giving them the appearance of dual bunches, bluntly conical, stamens deflexed, shy-setting. *Stalk* very long and strong. *Berries* large, roundish ovate, on strong *foot-stalks*, and marked with a very distinct line or suture across the apex of each fruit. *Skin* thick and

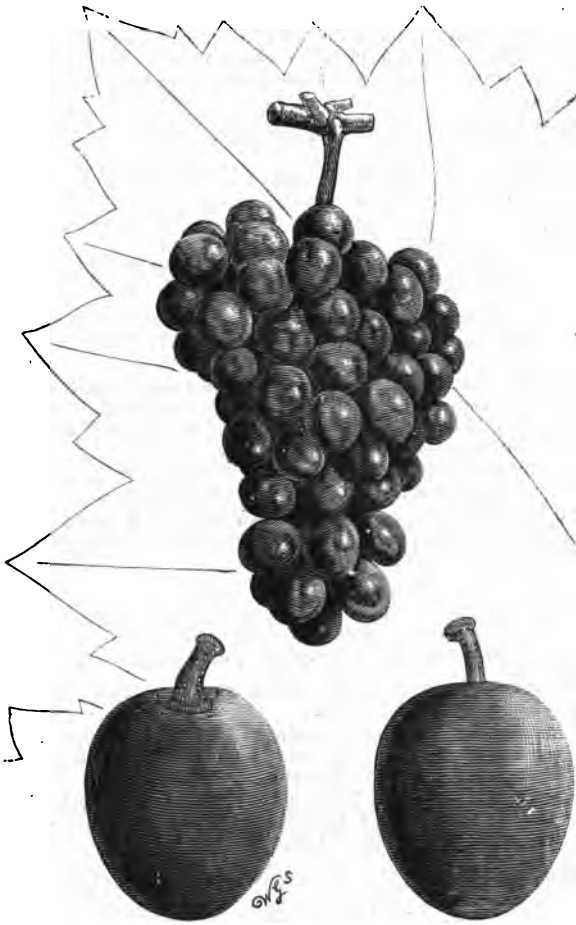


Plate III.—APPLEY TOWERS.

(Bunch ⅓; berries natural size.)

tough, of a deep purplish black colour, covered with a thick blue bloom. *Flesh* firm, tinged with red; seeds large. *Flavour* strong and sparkling, becoming rich and sweet when well ripened; in this respect very much resembling the Black Morocco.

HISTORY, ETC.—This is a comparatively new Grape, having been first brought under notice by Mr. Bell, of Clive House, Alnwick, who submitted examples of it to the Fruit Committee in 1876, under the name of *Clive House Seedling*. Subsequently, it was proved to have been raised at Alnwick Castle, and hence the name *Alnwick Seedling* was adopted. It is stated to be a hybrid between Black Morocco and some other black variety.

CULTURAL NOTES.—The remarkably free habit and fine constitution of this Grape renders the plant extremely easy of cultivation. The berries require to be carefully set with the pollen of some other variety. It ripens freely and colours thoroughly under ordinary treatment, and keeps well, the skin shrivelling before decaying.

AMBER MUSCADINE.—Royal Muscadine.

ANGERS FRONTIGNAN (41).—A round black Muscat Grape. *Season:* early. *Merits:* first-class as to flavour; an improvement on the Black Frontignan, which it resembles.

SYN.—*Muscat Noir d'Angers, Muscat Noir des Pyrénées, Muscat Noir Tardif, Muscat Noir d'Eisenstadt, Caillaba.*

VINE.—*Growth* free, moderately robust, producing short-jointed wood, with large prominent buds; very fruitful. *Leaves* roundish, of medium size, dying off with a slight reddish tinge.

FRUIT.—*Bunches* medium sized and very compact, with small shoulders; the berries very closely and well set. *Berries* small and roundish. *Skin* purplish black, with a thick bloom. *Flesh* firm, yet tender and juicy, very sweet and rich, with a strong Muscat or Frontignan flavour.

HISTORY, ETC. — Raised at Angers by M. Vibert. It has been grown at Chiswick for some years, but is not in very general cultivation.

CULTURAL NOTES.—Succeeds very well in an ordinary Vinery; requiring the same treatment as the Black Hamburgh, and in good seasons ripens very fairly on the open wall. Excellent for pot-culture.

ANSLEY'S LARGE OVAL.—Black Morocco.

APPLEY TOWERS (70)—Plate III.—An oval black Vinous Grape. *Season:* late. *Merits:* first-class quality, of good size and constitution.

VINE.—*Growth* moderately robust, shoots ripening freely. *Leaves* large, strong, and leathery, dying off reddish.

FRUIT.—*Bunches* of medium size, tapering and slightly shouldered, sets freely. *Berries* large ovate, on strong stalks. *Skin* tough, thick, very dark, with a fine bloom. *Flesh* firm, juicy, rich, with a strong rich flavour.

HISTORY, ETC.—Raised by Mr. Myles, gardener to Lady Hutt, Appley Towers, Ryde, from Gros Colman crossed by Alicante. Received First Class Certificate, Royal Horticultural Society, in 1889.

ARAMON (76)—Plate IV.—A round black Vinous Grape. *Season* late. *Merits:* second-rate, frequently only third-rate.

SYN.—*Burchardt's Prince, Plantriche, etc.*

VINE.—*Growth* remarkably rampant and vigorous, producing, wherever stopped, a great mass of young shoots, which are remarkably brittle; it requires more trimming and stopping than any other Vine, and the spurs soon become very large and coarse; very fruitful. *Leaves* medium-sized, roundish, dying off yellowish.

FRUIT.—*Bunches* large, of a long cylindrical shape, with a very long stalk, which is remarkably brittle, and may be broken with the slightest touch; very regularly but not closely set. *Berries* medium-sized, roundish. *Foot-stalks* thick. *Skin* of a dull purplish black colour, with a thin bloom. *Flesh* tender, juicy, with a very brisk, rich or strong vinous flavour when well ripened.

Plate IV.—ARAMON.

(Bunch ½; berries natural size.)

HISTORY, ETC.—This Grape, Dr. Hogg informs us, is largely cultivated in Languedoc and Provence, in the South of France, and is much esteemed as a wine Grape. The remarkable brittleness of the stalk of the bunch is some recommendation to it, as no knife being required, the crop is secured in much less time.

It has been grown in the conservatory at Chiswick for many years, having been received, under number, from Herr Burchardt, of Lansberg on the Warta, and was named *Burchardt's Prince* by the Fruit Committee, on account of its resemblance to Black Prince, and largely distributed under that name, but it never appears to have become popular, though there are many much inferior varieties grown.

CULTURAL NOTES.—A remarkably free-fruiting Grape wherever grown, requiring a considerable amount of heat to ripen the fruit thoroughly.

ARCHERFIELD EARLY MUSCAT.—Muscat of Alexandria.

ASCOT CITRONNELLE (48).—An oval white Muscat Grape. *Season:* first early; ripens three weeks before the Black Hamburgh. *Merits:* excellent in quality; worthy of being grown on account of its earliness, but too small for extended cultivation.

VINE.—*Growth* free and vigorous, but not robust, the shoots slender, always ripens well; free-fruiting.

FRUIT.—*Bunches* small, bluntly cylindrical in shape, very closely set. *Berries* small, roundish oval in shape. *Foot-stalks* stout. *Skin* thin, white or pale straw-coloured, very clear and transparent. *Flesh* tender, juicy, very richly flavoured, with a strong Muscat aroma.

HISTORY, ETC.—Raised by the late Mr. John Standish, of Ascot, being a cross between Chasselas Musqué and the old Citronelle; sent out in 1871.

CULTURAL NOTES.—Suitable for pots or cold orchard-houses, or in good seasons for the open wall.

ASCOT FRONTIGNAN (56).—A round white Muscat Grape. *Season:* first early. *Merits:* first-class in quality.

VINE.—*Growth* strong and vigorous; free-bearing and ripens readily. *Leaves* deeply lobed, with reddish veins and leaf-stalks.

FRUIT.—*Bunches* of medium size, strongly and somewhat broadly shouldered, rather thin, and not requiring much thinning. *Berries* round and small. *Skin* thin, pale greenish white. *Flesh* firm, very sweet, and with a rich Muscat flavour.

HISTORY, ETC.—A cross between Muscat de Saumur and Chasselas Musqué, raised by the late Mr. J. Standish, of Ascot.

CULTURAL NOTES.—A Vine of this variety is growing in Mr. G. F. Wilson's orchard-house at Weybridge, trained along under the ridge, where it ripens its fruit freely, without any artificial heat.

AUGUST FRONTIGNAN (42).—A round black Muscat Grape. *Season*: first early, quite three weeks in advance of Black Hamburgh. *Merits:* valuable for its earliness and hardiness, but too small to merit extended cultivation.

SYN.—*Muscat d'Août.*

VINE.—*Growth* very slender, but free; very fruitful.

FRUIT.—*Bunches* small and compact. *Berries* small, round, occasionally inclining to ovate. *Skin* thin, of a dark purplish colour. *Flesh* very juicy and sweet, with a slight trace of Muscat.

HISTORY, ETC.—Raised by M. Vibert, of Angers.

CULTURAL NOTES.—Generally grown as a pot Grape, for which purpose it is very suitable; it ripens also on the open wall.

AUVERGNE FRONTIGNAN (57).—A round white Muscat Grape. *Season:* first early. *Merits:* first-class in flavour, and suitable for cultivation as an early, high-flavoured Grape.

SYN.—*Early Auvergne Frontignan, Muscat Eugenien, Muscat du Puy de Dôme.*

VINE.—*Growth* free and vigorous, and always ripens well; very fruitful.

FRUIT.—*Bunches* medium sized, rather long and cylindrical in shape, and closely set. *Berries* small and round. *Skin* clear white, a great portion of the berries becoming of a deep amber when fully ripe, and when so, extremely rich and pleasant, with a strong Muscat aroma; the flesh crisp and juicy.

Plate V.—BLACK CORINTH.

(Bunch ⅓; berries natural size.)

HISTORY, ETC.—This is one of the many introductions of the late Mr. Rivers, and was much esteemed by him.

CULTURAL NOTES.—Succeeds well for pot-culture, and in orchard-houses, or on open walls.

BICANE (11).—An oval white Sweetwater Grape. *Season:* early. *Merits:* a first-class early white Grape, well worthy of cultivation.

SYN.—*Vicane, Panse jaune.*

VINE.—*Growth* moderately strong, the wood short-jointed, light coloured, with rather prominent buds, ripening freely; moderately fruitful. *Leaves* medium sized, covered on the under surface with a light, thick down.

FRUIT.—*Bunches* medium sized, compact or rather short, with broad shoulders, shy-setting, stamens deflexed. *Foot-stalk* short and stout. *Berries* medium sized, roundish oval. *Skin* thin and tender, white, almost transparent with a thin bloom. *Flesh* tender, very juicy, with a sweet pleasant flavour.

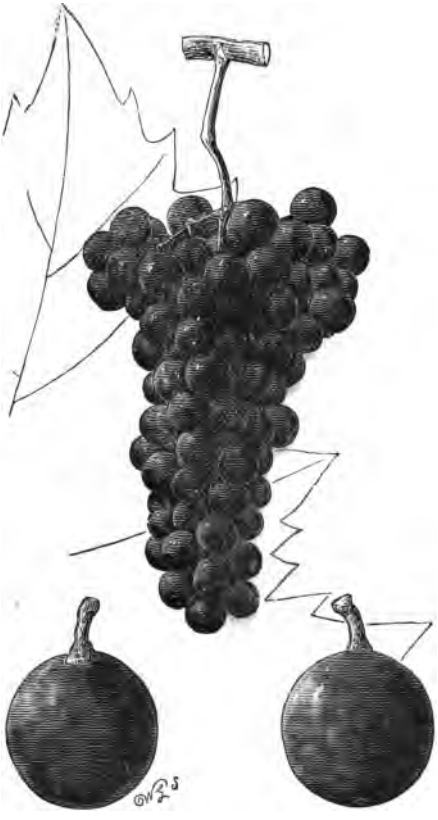


Plate VI.—BLACK FRONTIGNAN.
(Bunch ⅓; berries natural size.)

HISTORY, ETC.—Received at Chiswick from the late M. A. Papeleu, nurseryman, Wetteren, Ghent. It fruited in 1861-62, and was very favourably reported on by Dr. Hogg at the time; it has, however, somehow been lost, and awaits re-introduction. The *Panse jaune* is a large, coarse Grape, and is frequently called Bicane on the Continent.

CULTURAL NOTES.—It will succeed admirably in any house suitable for Black Hamburgh.

BLACK ALICANTE.—Alicante.

BLACK CHAMPION.—Mill Hill Hamburgh.

BLACK CHASSELAS.—Black Muscadine.

BLACK CORINTH (8)—Plate V.—A round black Sweetwater Grape. *Season:* early. *Merits:* second-rate; an extremely interesting sort.

SYN.—*Corinthe noir, Currant Grape, Patras Currant, Zante, Raisin de Corance of the Romans.*

VINE.—*Growth* moderately robust and vigorous; matures well, and is very fruitful.

FRUIT.—*Bunches* from four to six or eight inches long, tapering, with long loose shoulders. *Stalks* slender. *Berries* very small, about the size of small peas, round. *Skin* purplish red. *Flesh* juicy, sweet and pleasant, and without seeds.

HISTORY, ETC.—This is the Grape producing the Currants of commerce—"currant" being here a corruption of "Corinth"—from the berries resembling those of our Currants in size, etc. This Grape is very extensively cultivated in the Morea, Greece, and the Ionian Islands; but more especially in the districts of Zante, Corinth, and near the town of Patras, from whence as much as 75,000 tons of dried fruit have been exported in one season. The Vines are grown as low bushes, the crop ripening in succession from the first shoots, and the laterals, which also bear. The fruit, after being gathered, was formerly spread out on a specially smoothed plot of ground to dry, in which process the berries dropped from the stalks—which sufficiently accounts for the small stones and grit formerly so often found amongst Currants, and for the necessity of washing them. Now, as we learned from the late Mr. Maw, of Broseley, the better cultivators use flat wooden trays for drying the fruit, so that it is kept quite clean. Currants have long been used in this country, Sir Walter Raleigh, in the reign of Queen Elizabeth, having a monopoly of their importation. The Corinth Grape, although generally seedless, sometimes produces full-sized large berries with seeds—reverting to the "Grape," as it were. Cultivation seems to tend to this, as in many districts—notably at Leghorn—its cultivation had to be abandoned, on account of that tendency. It is figured in *The Transactions of the Horticultural Society*, i, 246, 1832.

CULTURAL NOTES.—This Grape is only grown as a curiosity in this country; it will succeed in a Black Hamburgh-house, grown in a large pot or box. At Chiswick it has fruited frequently.

BLACK FRONTIGNAN (43)—Plate VI.—A round black Muscat Grape. *Season:* early. *Merits:* in flavour, first-class.

SYN.—*Muscat noir ordinaire, Muscat noir.*

VINE.—*Growth* moderately strong and vigorous, very free, always ripening freely; very fruitful.

FRUIT.—*Bunches* compact, long and cylindrical in shape, frequently with one large shoulder, and closely set. *Berries* below medium size, round. *Skin* thin, of a dull bluish black colour, with a thick bloom. *Flesh* firm (might be termed thick), of a reddish tinge, with a strong, rich, Muscat flavour.

HISTORY, ETC.—Introduced into this country by Sir William Temple, in 1654, and one of the very oldest Grapes in cultivation. The name, Frontignan, is taken from a town in France, celebrated for its excellent wine—generally called Frontignac.

CULTURAL NOTES.—Grown generally as a pot-plant, under which condition it fruits very freely; it also ripens extremely well in fine seasons on the open wall, and is of good quality.

BLACK HAMBURGH (1)—Plate VII.—An oval black Sweetwater Grape. *Season:* excellent as an early-forcing Grape, and the best of all for a

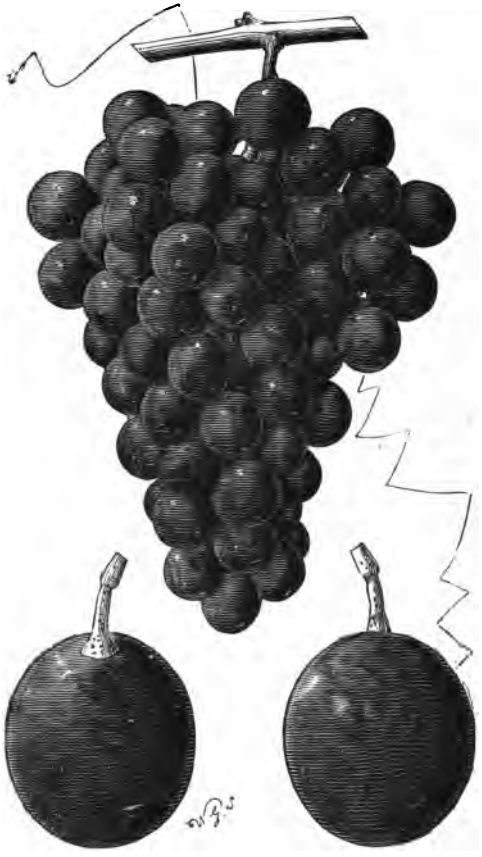


Plate VII.—BLACK HAMBURGH.

(Bunch ⅓; berries natural size.)

general crop, but requires careful attention to keep it in good condition after Christmas. *Merits:* first-class in every sense; the best and most useful Grape in cultivation.

SYN.—*Black Tripoli, Braddick's Seedling Hamburgh, Chasselas de Jerusalem, Frankenthal, Garston Black Hamburgh, Gros Bleu, Hampton Court Black Hamburgh, Kish-mish Ali, Knevett's Black Hamburgh, Muscatellier noir, Pope Hamburgh, Red Hamburgh, Tripoli, Victoria Hamburgh, Warner's Hamburgh*, and *Trollinger*, the best known German synonym.

VINE.—*Growth* free and vigorous, with a remarkably fine constitution; the wood moderately strong, always ripening well; very fruitful; young shoots pale green, yet occasionally tinged with red. *Leaves* of medium size, nearly smooth, pale green in colour. *Leaf-stalks* and venation sometimes reddish, and when so, the leaves in dying off become slightly coloured, and thus differ from the ordinary dull yellow colour which the decaying leaves of this variety usually assume.

FRUIT.—*Bunches* medium sized, ovate in shape, with broad shoulders, generally very compact, but sometimes loose and straggling; average weight from one pound to two pounds; sets very freely at all times. *Berries* large, from one inch to one-and-a-half inch in diameter, roundish-ovate in shape, but varying greatly in this respect, sometimes being quite round; the smaller berries generally ovate and quite smooth, the larger ones having a distinctly hammered appearance. *Skin* deep bluish black, covered with a fine bloom. *Flesh* firm, yet tender, juicy and melting, with a rich sugary and very pleasant flavour.

HISTORY, ETC.—The Black Hamburgh Grape is stated to have been imported from Hamburgh, in the early part of the last century, by Mr. John Warner, a London merchant, who established a Vineyard. Hence it became known as Warner's Black Hamburgh—*i.e.*, Mr. Warner's Black Grape, from Hamburgh; Hamburgh being the seaport town of northern Germany. It is essentially a German Grape, being met with in every part of that country where Grapes are cultivated, and under very numerous synonyms; the best known being that of Trollinger and Frankenthaler, which, of late years, has been much adopted in this country—by some as synonymous with Black Hamburgh, by others as representing a larger and coarser variety. The confusion that has arisen in this respect is entirely due to accidental circumstances. A very excellent illustration of this was afforded in the great conservatory at Chiswick. The varieties of Vines planted therein were procured from all quarters; one half being planted in an outside border, and the others in a shallow border inside. On fruiting, the varieties of Black Hamburgh, which were planted in the outside border, were all large, the berries round, with a hammered appearance, etc.; while the others were small, smooth, ovate, etc., and generally sweeter. The former were duly labelled Frankenthal, the latter Black Hamburgh, eyes of each being propagated and grown under reversed conditions the appearance and the characters of each were alike reversed. There is no permanent distinction among the many so-called varieties of Black Hamburgh, the Mill Hill and Dutch excepted, which are so decidedly distinct that no possible confusion need arise about them.

Amongst the other synonyms, Black Tripoli was long considered to apply to a larger and superior variety, through its excellent and extensive cultivation at Welbeck, but that name is now obsolete; the same may be said of Braddick's, Garnston, and Knevett's Black Hamburghs. Pope Hamburgh was so called through one of the ancestors of Basil Fitzherbert, Esq., of Swynnerton Hall, a Staffordshire, bringing cuttings from a friend who resided near Rome, upwards of one hundred years ago, and naming it The Pope. The original Vine may still be seen at Swynnerton Hall. The late Mr. Fleming, of Trentham, on seeing this Vine, considered it a distinct variety, and distributed it as The Pope's Hamburgh. Hampton Court Black Hamburgh is so called from the large Vine at Hampton Court Palace, and has the reputation of being the true variety, producing small ovate berries. Victoria Hamburgh was for a long time popular, as the largest and finest variety, but that name is not now referred to. Even the Red Ham-

burgh had its champions with regard to its distinctive features, but there are not many growers now who are proud of producing it. From France, we have received it under the names of Gros Bleu, Chasselas de Jerusalem, and Muscatellier Noir; but these are merely modern nursery names. In France proper, this Grape is scarcely known, excepting under the English name of Black Hamburgh or the German one of Frankenthaler. In the *Revue Horticole*, 1882, 480, a coloured figure of a Grape named Violet Kish-mish Ali is given; this variety is stated by M. Pulliat to be distinct from the Black Hamburgh by reason of the foliage dying off red, but this character is, as already stated, not constant.

Amongst the many remarkable Black Hamburgh Vines in this country, the following may be noted:—

1. The Vine at Cumberland Lodge, Windsor Park, fig. 19, which completely fills a house one hundred and thirty-eight feet four inches long and twenty feet wide, and has a stem three feet eight inches in circumference. This noble Vine is nearly twice the size of the one at Hampton Court, and is in perfect health and vigour; the produce being good. The crop of 1879 was two thousand bunches, of an average weight of three-quarters of a pound, or a total of one thousand five hundred pounds of Grapes.

2. The Great Vine at Hampton Court, which, if not the largest, is probably the best known. This, which is stated to be one hundred and twenty years old, fills a house sixty-five feet long by thirty feet wide, and has a main stem three and a half feet in circumference. This Vine is in remarkably good health, and annually bears a large crop of small bunches—as many as one thousand seven hundred in one season.

3. Another celebrated Vine is that planted by the late Mr. P. Kay, at Finchley, which, in 1862, when six years old, entirely filled a house ninety feet in length and eighteen feet in width, and which annually produces prodigious crops of magnificent Grapes.

4. The Vine at Manresa Lodge, Roehampton, the largest Vine in this country, planted in 1862, filling a house four hundred and twenty-four feet long, and producing a crop of eight hundred bunches of excellent fruit.

5. The Vine at Sillwood Park, Sunninghill, a descendant of that at Cumberland Lodge, and filling a house one hundred and twenty-nine feet in length by twelve feet in width. It is in excellent health; the main stem straight, about three feet in circumference, and rising near the front, about the centre of the house, nine or ten side branches being trained horizontally, and supplying the bearing rods. The crop averages one thousand eight hundred bunches of fair size annually.

6. The Vine at Kinnell House, Breadalbane, Scotland, stated to have been planted in 1832, and now to cover a house one hundred and seventy-two feet long by twenty-five feet broad.

Cultural Notes.—The Black Hamburgh is the standard and national Grape of England; the most generally grown, and by far the best. It is, moreover, the easiest of all Grapes to cultivate, the treatment required being of the ordinary character, as recommended in the previous chapters. It is the gardener's friend amongst Grapes. Many examples of superior cultivation might be mentioned. Amongst extraordinary results, Mr. Hunter, of Lambton Castle, has the honour of having grown the largest bunch of this variety, which was exhibited at Belfast in 1874, and weighed twenty-one pounds twelve ounces. A second bunch, weighing thirteen pounds two ounces, also grown by Mr. Hunter, was shown in Manchester in 1875. Mr. Meredith, of Garston, had a bunch weighing nine and a half pounds in 1865. Mr. Rayne, Chelmsford, a bunch weighing eight pounds fourteen ounces, in 1860. Mr. Davis, at Oakhill, in 1858, a bunch weighing eight and a half pounds, the single berries of which measured four and a half inches in circumference.

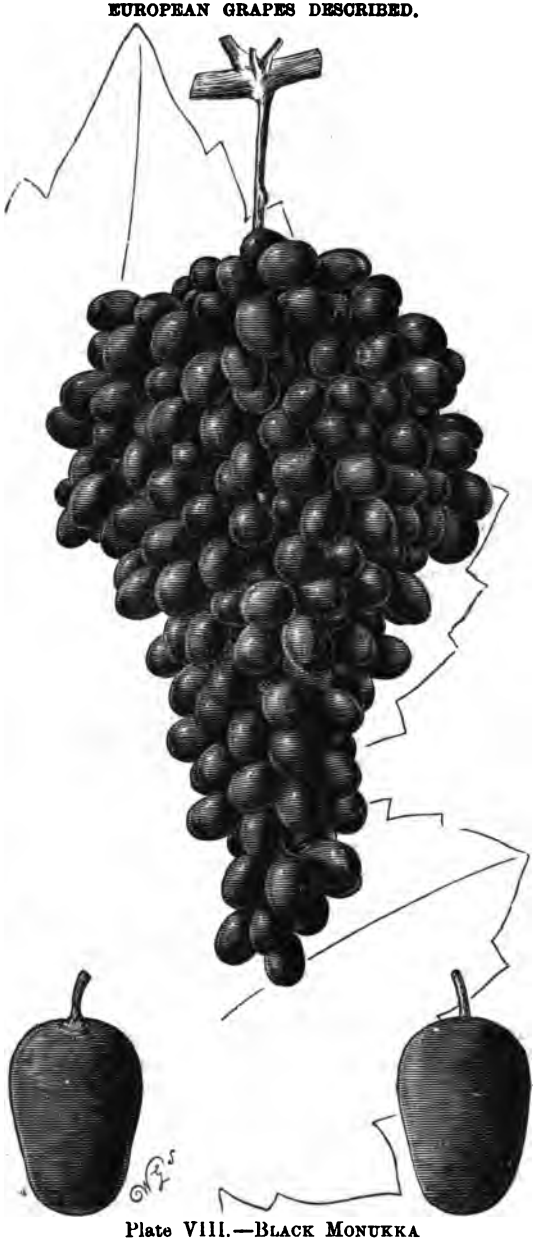


Plate VIII.—Black Monukka
Bunch ⅓; berries natural size.)

BLACK JULY (6).—A round black Sweetwater Grape. *Season:* first early. *Merits*: valuable only on account of its earliness.

SYN.—*July, Early Black July, Raisin de la Madeleine.*

VINE.—Very free and vigorous in growth, and an abundant bearer.

FRUIT. —*Bunches* rather long and loose, and sometimes set badly. *Berries* small, round. *Skin* rather thick, deep purple, with a fine bloom. *Flesh* sweet and juicy, not rich, and of no particular character.

CULTURAL NOTES.—Very suitable for planting against a wall in the open air, where it usually ripens freely.

BLACK LISBON.—Alicante.

BLACK MONUKKA (2).—Plate VIII.—An oval black Sweetwater Grape. *Season:* mid-season. *Merits*: one of the most pleasantly-flavoured of Grapes, particularly agreeable to the palate, and useful to cut up for sweetmeats: but can only be recommended for cultivation as an extra sort where plenty of means are at command.

VINE.—*Growth* remarkably strong and robust, requiring considerable space. *Leaves* large, rugose, with a reddish tinge; the leaf-stalks deep red. A somewhat shy fruiter, young plants seldom cropping well.

FRUIT.—*Bunches* very large, frequently measuring twenty-four inches to twenty-six inches in length, and broadly shouldered, but of a remarkably regular tapering form, and weighing from three pounds to five pounds. *Berries* small, long ovate, inclining to be conical, or in shape like an acorn, measuring seven-eighths of an inch in length, and three-eighths of an inch in diameter. It cannot be said to set well, although it is very regular, and the berries are all uniform; yet there are no perfect seeds, only one—or at most two—half formed, and these being soft, like the flesh, are, as well as the skins, eaten with it. *Skin* thin, adhering to the pulp, which is firm, fleshy, not melting, yet very tender and full of juice. In colour it approaches black when well ripened, but is more frequently half-grizzly, and with a thin coating of bloom.

HISTORY, ETC.—The Black Monukka is a Grape supposed to be of Indian origin. It was introduced by the late Mr. Johnson, gardener at Hampton Court, and was by him sent to the Horticultural Society, and planted in the Great Conservatory at Chiswick, where it is now growing. It has been from thence distributed, but is not much cultivated in this country.

CULTURAL NOTES.—Ripens freely under the same treatment as Black Hamburgh, and fruits most freely on young rods from established plants. It requires very little thinning. Some years ago we made some interesting experiments in hybridising this Grape with the Black Hamburgh, and succeeded in raising and fruiting fifteen plants, all of a singular yet widely different character, but none worthy of cultivation.

BLACK MOROCCO (71).—An oval black Vinous Grape. *Season:* late. *Merits:* one of the most beautiful of Grapes when well grown, but its uncertain character renders it scarcely worthy of cultivation.

SYN.—*Ansley's Large Oval, Morocco, Black Muscadel, Horsforth's Seedling, Kempsey Alicante, Le Cœur.*

VINE.—*Growth* strong and robust; a very shy cropper. *Leaves* large, rugose, much cut, with reddish venations and foot-stalks, dying off reddish.

FRUIT.—*Bunches* large, from twelve inches to fifteen inches long, on very stout foot-stalks, with strong irregular shoulder. *Berries* long-ovate, very large

generally very badly set; indeed, this is one of the worst setting Grapes grown; stamens deflexed. *Skin* thick, reddish brown, becoming nearly black when well ripened, but always paler round the stalk, which is very stout. *Flesh* very firm, and when well ripened, very rich and piquant in flavour and extremely pleasant.

HISTORY, ETC.—This is a very old Grape, to be met with in old gardens. It is figured in the *Pomological Magazine*, vol. iii., as *Horsforth's Seedling*, but it is not cultivated to any extent. Some years ago it gained considerable notoriety at Kempsey through its very successful cultivation, and it was for a time considered distinct, and so received the name of *Kempsey Alicante*.

CULTURAL NOTES.—Requires artificial impregnation of the flowers to set it properly; also a good deal of heat to ripen the fruit.

BLACK MUSCADINE (7).—A round black Sweetwater Grape. *Season:* early. *Merits:* second-rate.

SYN.—*Chasselas noir*, *Black Chasselas*, *Chasselas de Fontainebleau rouge hâtif*.

VINE.—*Growth* free and vigorous, and very fruitful.

FRUIT.—*Bunches* of medium size, rather close and compact, well set. *Berries* small, round. *Skin* thin, deep purplish black, with a thin bloom. *Flesh* firm, yet juicy and sweet, resembling the Royal Muscadine; very pleasant.

CULTURAL NOTES.—Will succeed against a wall in the open air in good seasons.

BLACK MUSCAT OF ALEXANDRIA.—Muscat Hamburgh.

BLACK PORTUGAL.—Alicante.

BLACK PRINCE (3)—Plate IX.—An oval black Sweetwater Grape. *Season:* early. *Merits:* extremely handsome in appearance, and valued on this account, as well as for its free-fruiting properties, but in regard to flavour it is far inferior to Black Hamburgh. It can only be classed as a second-rate sort.

SYN.—*Pocock's Damascus*, *Cambridge Botanic Garden*, *Boston*.

VINE.—Very free and vigorous in constitution, and very fruitful. *Leaves* roundish, not much cut, dying off purplish in autumn.

FRUIT.—*Bunches* very long, frequently twenty or twenty-four inches, with a long stalk, tapering very regularly and gradually from the shoulders downwards; sometimes they are almost cylindrical in shape. *Berries* medium-sized, ovate, always well set. *Skin* thick, dark purple in colour, with a thick bloom. *Flesh* dark, juicy, and sweet, but generally with a slight astringency, which is not much relished.

HISTORY, ETC.—A very old variety, to be found in most old collections of Grapes, although we have never met with it in Continental collections. It is seldom planted now.

CULTURAL NOTES.—One of the most free-fruiting and most easily cultivated Grapes in existence, ripening, under the same treatment, a little in advance of Black Hamburgh, always well coloured, even when not thoroughly ripe. It requires to be used soon after becoming ripe, as when allowed to hang the berries soon commence to shrivel. The late Mr. Hill, of Keele Hall Gardens, who was one of the most successful cultivators and exhibitors of this Grape, had it grafted on the Black Hamburgh. It is one of the best black Grapes for the open air.

BLACK ST. PETER'S.—Alicante.

BLACK SPANISH.—Alicante.

BLACK TOKAY.—Alicante.

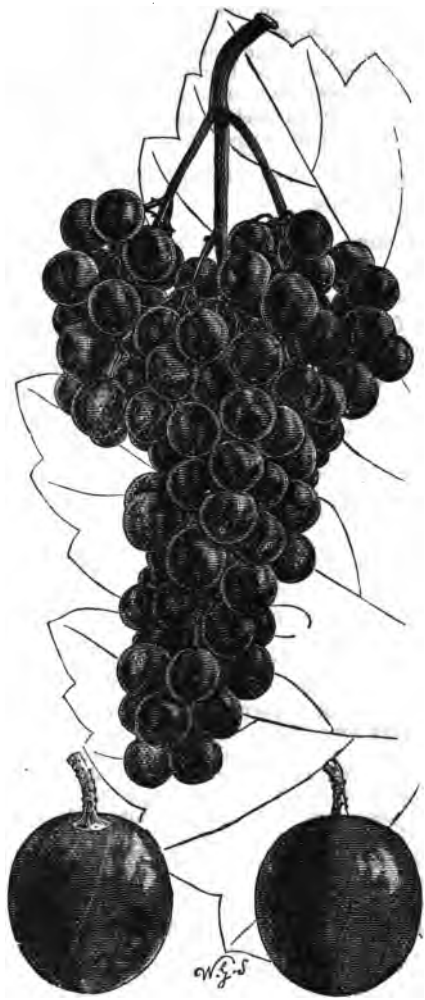


Plate IX.—BLACK PRINCE.
(Bunch ⅓; berries natural size.)

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BLACK TRIPOLI.—Black Hamburgh.

BOSTON.—Black Prince.

BOWOOD MUSCAT.—Muscat of Alexandria.

BRADDICK'S SEEDLING HAMBURGH.—Black Hamburgh.

BUCKLAND SWEETWATER (20)—Plate X.—A round white Sweetwater Grape. *Season:* early, useful for summer. *Merits:* very showy and handsome, but second-rate in quality.

VINE.—*Growth* moderately strong and free, tolerably fruitful. *Leaves* similar to those of Black Hamburgh, dying off a very pale yellow.

FRUIT.—*Bunches* medium-sized, averaging from three-quarters of a pound to two pounds in weight, rather short, with very broad shoulders; always well-set. *Berries* large or above the medium size, round. *Skin* thin, almost transparent, greenish white, assuming a pale straw-yellow colour when fully ripe, and if allowed to hang for any length of time it becomes almost white, and very different in appearance from freshly ripened fruit; the skin also becomes thick and tough as well as the flesh, and the entire character of the Grape is altered. *Flesh* thin, soft, juicy, and with a pleasant Sweetwater flavour; when kept long it becomes almost tasteless.

HISTORY, ETC.—This is an English seedling Grape, raised at Buckland, near Reigate, by a gentleman who brought the seed from the Continent. Cuttings of the seedling plant were given to Messrs. Ivery & Son, nurserymen, Dorking, and one or two other parties. Mr. Ivery grafted it on the Black Hamburgh, and was successful in making it grow; very singularly all the others died, even the seedling plant, so that Mr. Ivery held the entire stock, and sent it out to the public about the year 1860. In some respects it resembles the Golden Hamburgh sent out a few years previously, and which it soon displaced, becoming the most popular white Grape. Excepting the Muscat of Alexandria and Foster's Seedling, there is no other white Grape so often seen at exhibitions.

CULTURAL NOTES.—It succeeds admirably under the same treatment as the Black Hamburgh, for which it forms a handsome companion; but is not so robust in constitution.

BURCHARDT'S AMBER CLUSTER.—Grove-End Sweetwater.

BURCHARDT'S PRINCE.—Aramon.

BUSBY'S GOLDEN HAMBURGH.—Golden Hamburgh.

CABAS A LA REINE.—Muscat of Alexandria.

CABRAL (12).—An oval white Sweetwater Grape. *Season:* mid-season. *Merits:* a fine showy Grape, second-rate in quality.

VINE.—*Growth* strong and robust; the wood somewhat gross, of a pale colour, and very downy around the *buds*, which are very large. *Leaves* large, soft, and covered with down, dying off yellow.

FRUIT.—*Bunches* medium-sized, short, with stout shoulders, generally well set. *Berries* above the medium size, roundish oval, on short and very strong warted foot-stalks. *Skin* thick and rather tough, of a pale yellow colour. *Flesh* firm, juicy, sweet, but not rich.

HISTORY, ETC.—Grown in the Royal Horticultural Society's Gardens, Chiswick, for some time. Not in general cultivation.

CULTURAL NOTES.—Requires heat to set it properly, and also to ripen the fruit.

CAILLABA.—Angers Frontignan.

CALABRIAN RAISIN.—Raisin de Calabre.

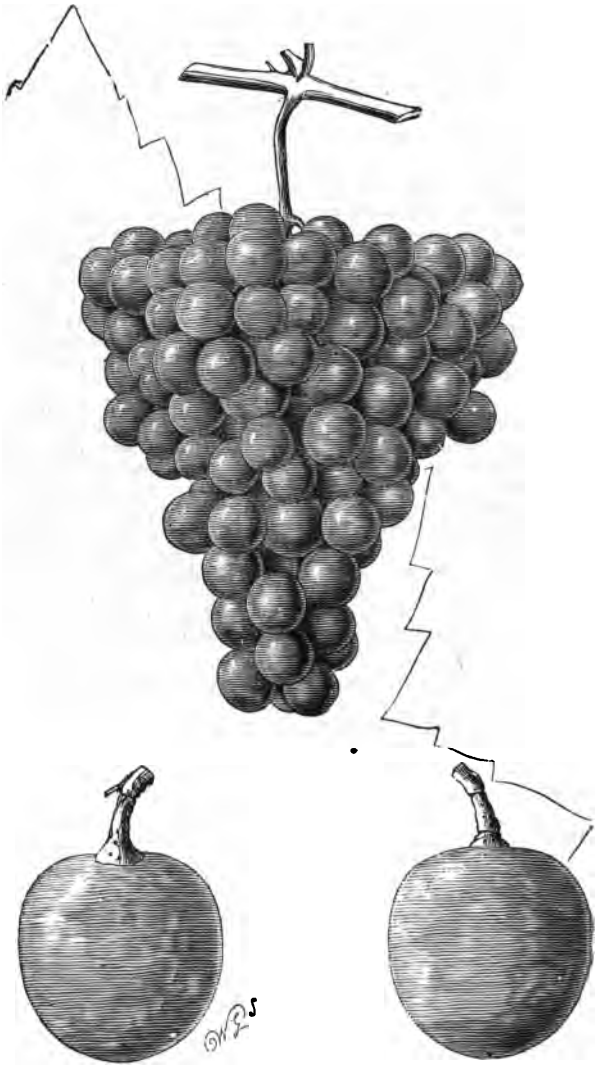

Plate X.—BUCKLAND SWEETWATER.

(Bunch ½; berries natural size.)

CAMBRIDGE BOTANIC GARDEN.—Black Prince.

CANON HALL MUSCAT (49).—A round white Muscat Grape. *Season:* late; requires heat. *Merits:* remarkably handsome, and of excellent quality, but inferior to Muscat of Alexandria for general purposes.

VINE.—*Growth* very strong and somewhat gross; the wood being thick, soft, and frequently not ripening well. *Buds* large. *Leaves* large, pale green, somewhat flabby, not so deeply lobed as the common Muscat, dying off yellow.

FRUIT.—*Bunches* large, or above the medium size, but rather shorter often badly set, with broad strong shoulders, and thick fleshy foot-stalks; flowers have six and seven stamens frequently. *Berries* very large, round, or nearly so. *Skin* thin, pale straw-yellow. *Flesh* firm, juicy, very rich, and with a strong Muscat flavour.

HISTORY, ETC.—This is stated to be a seedling from the Muscat of Alexandria, but its origin is uncertain. The earliest trace of it is at Canon Hall, Yorkshire, from whence it was sent to Lord Bagot. It is figured in the *Transactions of the Horticultural Society*, 2nd ser., i., 169. It was at one time largely cultivated, a Vine or two being found in every collection of Grapes; but it is every year becoming scarcer.

CULTURAL NOTES.—Few Grapes have been the cause of so much trouble to gardeners of the older school as the Canon Hall Muscat, through the difficulty experienced in its satisfactory cultivation. It is of rather bad constitution, the wood being often soft and pithy, and not ripening well; thus many spurs become blank. Again, it is difficult to set, excepting a high temperature is maintained, and great care is taken to impregnate the berries artificially. Some of the largest and finest examples we have heard of were grown by Mr. Kay, of Finchley, in 1891, the berries measuring three and three-quarter inches round, by four and a quarter inches in length; Mr. Kay grows it largely and with great success for market purposes, realising a very high price.

CHAMPION HAMBURGH.—Mill Hill Hamburgh.

CHAMPION HAMBURGH MUSCAT.—Muscat Champion.

CHAOUCH (13).—An ovate white Sweetwater Grape. *Season:* first early. *Merits:* recommended as a pleasant early variety.

SYN.—*Chavoush.*

VINE.—*Growth* strong and robust; fruitful. *Leaves* large.

FRUIT.—*Bunches* of medium size, long, somewhat loose, and frequently thinly set, stamens deflexed. *Berries* large, roundish-ovate. *Skin* clear, transparent, thin. *Flesh* very melting, juicy, sweet and pleasant, sometimes highly perfumed.

HISTORY, ETC.—A Grape named *Chavoush* was introduced from Turkey about eighteen years ago, as stated in the first edition of *Vines and Vine Culture*, with high commendations as being the favourite Grape of the Sultan, etc., but which proved to be a coarse, late, worthless sort. Specimens of the true variety were last season kindly sent us by Herr Horvath, Funfkirchen, Hungary, which is now described. It is, as stated by Herr Horvath, earlier than the Black Hamburgh, and is, in Constantinople, the favourite Grape, occupying the same position there as the Chasselas does in Paris.

CULTURAL NOTES.—Ripens freely without much heat, but requires it to set the fruit properly.

CHAPTAL (22).—A round white Sweetwater Grape. *Season:* mid-season. *Merits:* second-rate.

VINE.—*Growth* free and vigorous, the shoots always ripening well; very fruitful. *Leaves* medium-sized, dying off yellow.

FRUIT.—*Bunches* large, or above medium-sized, of a long tapering form, with generally one large shoulder; always well set. *Berries* medium-sized, round. *Skin* pale straw, nearly transparent. *Flesh* firm, juicy, fairly sweet and pleasant, but not rich.

HISTORY, ETC.—This has been grown for a good many years at Chiswick, and also at Trentham by the late Mr. Fleming, where it was esteemed, but it is not in general cultivation.

CULTURAL NOTES.—Requires much the same treatment as Royal Muscadine, of which it might be termed a large-bunched coarse variety.

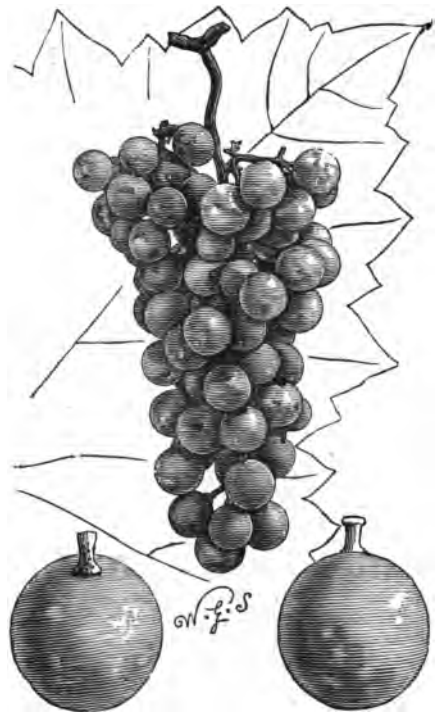

Plate XI.—CHASSELAS MUSQUÉ.
(Bunch ½; berries natural size.)

CHARLESWORTH TOKAY.—Muscat of Alexandria.

CHASSELAS.—Royal Muscadine.

CHASSELAS DE FLORENCE (21).—A round white Sweetwater Grape. *Season*: early. *Merits*: second-rate.

VINE.—*Growth* free and vigorous, the shoots slender, always ripens well; very fruitful.

FRUIT.—*Bunches* long, medium-sized, and well set. *Berries* small, or below medium size, round. *Skin* thin, transparent, pale straw, or nearly white; a great portion of the berries assuming a violet tinge, and others a cinnamon-brown. *Flesh* firm, sweet, and very pleasant.

HISTORY.—Grown in the Royal Horticultural Society's collection, and received from Messrs. Baumann, of Bölwyller.

CULTURAL NOTES.—Requires the same treatment as the Royal Muscadine in all respects.

CHASSELAS DE FONTAINEBLEAU.—Royal Muscadine.

CHASSELAS DE FONTAINEBLEAU ROUGE HÂTIF.—Black Muscadine.

CHASSELAS DE JERUSALEM.—Black Hamburgh.

CHASSELAS MUSQUÉ (58).—Plate XI.—A round white Muscat Grape. *Season*: early. *Merits*: first-rate in quality, but unsatisfactory.

SYN.—*Muscat de Jésu, Chasselas Musqué de Nantes, Cranford Muscat, Eugénien Frontignan, Josling's St. Albans, Muscat Muscadine, Muscat Fleur d'Oranger, Muscat Regnier, Muscat Orange du Portugal, Primavis Muscat.*

VINE.—*Growth* moderately free and robust, the shoots occasionally very strong; free fruiting. *Leaves* rather small, roundish, or but slightly lobed, ripening off early, of a pale yellow colour.

FRUIT.—*Bunches* medium sized, tapering, on rather long, but strong foot-stalks, and well shouldered; generally well set. *Berries* small, round, pale greenish white, changing to amber, and frequently with a tinge of russet when fully ripe. *Skin* thin, very subject to crack just as it is approaching maturity, so that before being fully ripe three parts of the berries have to be cut out, and the bunch is a mere skeleton. *Flesh* very firm, almost crisp, very rich and sparkling in flavour, and with a strong Muscat aroma.

HISTORY, ETC.—This is an old Grape, which has been long cultivated in this country, and also on the Continent, under a multitude of synonyms. It reproduces itself with tolerable correctness from seed. In 1845, it appeared as *Josling's St. Albans*, and was described in the *Gardeners' Chronicle;* and, subsequently in the *Journal of the Horticultural Society*, by Mr. R. Thompson, as a new and excellent Grape, greatly superior to the Frontignans, and hence obtained great popularity.

CULTURAL NOTES.—Apart from its liability to crack, this Grape requires no special cultivation. It succeeds well in pots, and ripens well in the ordinary Vinery. To prevent cracking, Mr. Blackmore allows it to fruit on suckers, or quite young wood, and is very successful. It is a Vine that suckers freely. It is also recommended to be grown in a rather poor inside border, so that little water may reach the roots whilst the berries are swelling and ripening. Ringing and notching the shoots just below the bunch—and even the stalks of the bunches themselves—have also been tried by some, but cannot be recommended, as any check to the vigour must intensify the cracking.

CHASSELAS MUSQUÉ DE NANTES.—Chasselas Musqué.

CHASSELAS NOIR.—Black Muscadine.

CHASSELAS PANACHÉ.—Aleppo.

CHASSELAS ROSE (33).—A round red Sweetwater Grape. *Season*: early. *Merits*: very desirable to cultivate as a pleasing contrast amongst black and white varieties.

SYN.—*Chasselas Rose de Falloux, Chasselas Rose Jalabert, Chasselas Rouge, Chasselas Rouge Royal, Red Chasselas.*

VINE.—*Growth* very free and vigorous, producing fine, well-ripened wood; exceedingly fruitful.

FRUIT.—*Bunches* medium sized, always well set. *Berries* small, round. *Skin* thin, transparent, of a very clear rosy red when well ripened, and very pretty. *Flesh* firm and juicy, with a pleasant Sweetwater flavour. This is, in all respects except colour, similar to Royal Muscadine.

HISTORY, ETC. — Received from M. André, of Angers, and cultivated at Chiswick for many years.

CULTURAL NOTES.— Succeeds admirably as an orchard-house or cool greenhouse Grape, ripening even more freely than the Royal Muscadine.

CHASSELAS ROSE DE FALLOUX.—Chasselas Rose.

CHASSELAS ROSE JALABERT.—Chasselas Rose.

CHASSELAS ROUGE.—Chasselas Rose.

CHASSELAS ROUGE ROYAL.—Chasselas Rose.

CHASSELAS VIBERT (23). — A round white Sweetwater Grape. *Season:* first early. *Merits:* first-class; one of the very best early Grapes.

VINE.—*Growth* free, moderately robust, and very fruitful. *Leaves* of medium size, round, deeply toothed, but slightly lobed.

FRUIT.—*Bunches* small, from six to twelve inches long, freely set. *Berries* medium, round. *Skin* thin, clear white. *Flesh* very firm, yet juicy, sweet and pleasant; one of the best Sweetwater Grapes.

HISTORY, ETC.—Received by Mr. Rivers from M. Vibert, of Angers.

CULTURAL NOTES.—Excellent for cultivation in an unheated orchard-house or Vinery; ripens freely; about ten days in advance of Royal Muscadine.

CHASSELAS VIOLET (34).—A round red Sweetwater Grape. *Season:* early. *Merits:* second rate.

VINE.—Moderately robust. The young shoots and leaves have a distinct violet tinge; hence the name.

FRUIT.—*Bunches* small, compact; sets freely. *Berries* small, round, becoming red directly after flowering. When ripe they are light red, and when over ripe still lighter in colour. *Flesh* firm, sweet, and pleasant. An interesting variety.

HISTORY, ETC.—Received from Herr Horvath, Hungary. Believed to be of French origin.

CULTURAL NOTES.—Will ripen in an orchard house.

CHAVOUSH.—Chaouch.

CIOTAT (24). —A round white Sweetwater Grape. *Season*: early. *Merits:* second-rate in quality; cultivated only as a curiosity.

SYN.—*Malmsey Muscadine, Parsley-leaved.*

VINE.—*Growth* free and vigorous, producing small but always well-ripened wood; very fruitful. *Leaves* small, bright green, deeply laciniated, very distinct in appearance.

FRUIT.—*Bunches* small and thin, but setting freely. *Berries* small, round. *Skin* thin, transparent, white. *Flesh* firm, sweet, and pleasant.

HISTORY, ETC.—A very old sort, apparently a sport from Royal Muscadine, which it resembles in every respect but the deeply cut leaves and somewhat smaller berries.

CULTURAL NOTES.—This Vine is very frequently grown as a purely ornamental variety for the beauty of the foliage. It fruits freely on open walls, and also in cool greenhouses.

CLIVE HOUSE SEEDLING.—Alnwick Seedling.

COMMON MUSCADINE.—Royal Muscadine.

COOPER'S BLACK. — Greatly resembles Gros Maroc, if it be not identical with that variety.

CORINTHE NOIR.—Black Corinth.

CRANFORD MUSCAT.—Chasselas Musqué.

CUMBERLAND LODGE.—Black Hamburgh.

CURRANT GRAPE.—Black Corinth.

DIAMANT TRAUBE (14).—An oval white Sweetwater Grape. *Season:* early. *Merits:* first-class.

VINE.—Of strong and robust growth ; fruitful. *Leaves* large and downy.

FRUIT.—*Bunches* short, not very large, not well set, stamens deflexed. *Berries* large, roundish ovate, of a clear greenish yellow colour. *Flesh* firm, sweet, and pleasant.

HISTORY, ETC. — Received from M. Léroy, of Angers, many years ago, and grown at Chiswick.

CULTURAL NOTES.—Fruits freely, and ripens in an unheated orchard-house at Chiswick.

DR. HOGG (59).—A round white Muscat Grape. *Season:* mid-season. *Merits:* first-class ; one of the best flavoured and best constitutioned of the smaller Muscat Grapes ; deserving of cultivation.

VINE.—*Growth* free and vigorous, producing firm, moderate-sized wood, which always ripens well ; very fruitful. *Leaves* medium sized.

FRUIT.—*Bunches* long, measuring from twelve inches to eighteen inches, and tapering to rather a narrow point ; shoulders long and rather loose, drooping, always well set. *Berries* medium sized, round, on strong stalks. *Skin* membraneous, very clear, almost transparent, and when quite ripe, assuming an amber tint. *Flesh* firm, very sweet, and with a rich Muscat or Frontignan flavour.

HISTORY, ETC.—This is a seedling raised by the late Mr. Pearson, of Chilwell, about 1869, from Duchess of Buccleuch, and was exhibited before the Fruit Committee in 1871, and awarded a First Class Certificate. It is now very general in cultivation, taking the place of Chasselas Musqué.

CULTURAL NOTES.—Succeeds well in an ordinary Vinery, but requires a little more heat than the Black Hamburgh to ripen thoroughly. It is, however, one of the hardiest of its class.

DUCHESS OF BUCCLEUCH (60).—A round white Muscat Grape. *Season*: mid-season. *Merits*: first-class as to flavour, but, owing to its uncertain ripening, scarcely worthy of cultivation.

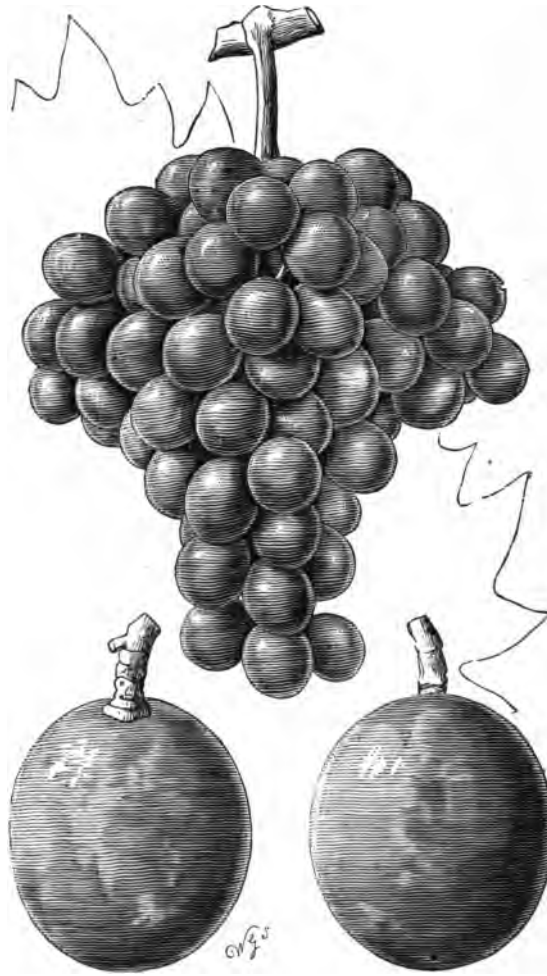

Plate XII.—DUKE OF BUCCLEUCH.
(Bunch ½; berries natural size.)

VINE.—*Growth* strong and vigorous, the wood ripening freely; extremely fruitful. *Leaves* roundish, much serrated, and generally of a deep green colour.

FRUIT.—*Bunches* very long and tapering, with large drooping shoulders; always well set. *Berries* small, round. *Skin* thin, greenish white, assuming a yellowish tinge when fully ripe, with a thick bloom. *Flesh* tender, very juicy, sweet and rich, with a strong Muscat flavour.

HISTORY, ETC.—This is a seedling raised by Mr. W. Thomson, when gardener to the Duke of Buccleuch, at Dalkeith. It received a First Class Certificate from the Royal Horticultural Society in 1863.

CULTURAL NOTES.—Will grow and fruit well in a Hamburgh-house, but to ripen it properly more heat is required. When grown in a cool temperature, it is somewhat apt to shank, and many of the berries remain of a sickly greenish hue, and never become sweet.

DUKE OF BUCCLEUCH (25)—Plate XII.—A round white Sweetwater Grape. *Season*: early; best suited for summer use. *Merits*: first-class; one of the noblest and handsomest Grapes in cultivation.

VINE.—*Growth* very robust, inclining to be gross, the young shoots being thick, somewhat soft, and ripening badly; not very productive. *Leaves* large, fleshy, roundish, deeply serrated, and but slightly lobed.

FRUIT.—*Bunches* large, ovate, or rather short with broad stout shoulders; stalk stout, inclining to be gross and fleshy. *Berries* very large, roundish, somewhat flattened at both ends. *Skin* thin, of a pale greenish yellow, and becoming a fine amber colour when fully ripe; occasionally subject to spot. *Flesh* exceedingly tender and juicy, with a very rich and remarkably pleasant flavour.

HISTORY, ETC.—This noble Grape is a seedling raised by Mr. W. Thomson, of Clovenfords, when gardener to the Duke of Buccleuch, at Dalkeith. It was awarded a First Class Certificate by the Royal Horticultural Society in 1872.

CULTURAL NOTES.—The most successful cultivator of this Grape is, no doubt, the raiser himself, Mr. Thomson, at Clovenfords. The enormous quantity of fruit and the magnificent quality of the same, testify that there, at least, no difficulty is experienced in its cultivation. At Drumlanrig it succeeds remarkably well; as it did also with the late Mr. Stevens at Trentham, and with Mr. Harrison Weir in a ground Vinery. It is somewhat difficult to establish, but once started it grows with great luxuriance, and fruits freely on the young rods. It should, therefore, be pruned on the long spur system, and grown in an inside border and in a somewhat dry atmosphere. The bunches when in flower should be carefully set, and a temperature and general treatment provided similar to that given to the Black Hamburgh.

DUTCH HAMBURGH (77).—A round, black, Vinous Grape. *Season*: mid-season; apt to shrivel when allowed to hang. *Merits*: second-rate quality; very handsome in appearance.

SYN.—*Wilmot's Hamburgh.*

VINE.—*Growth* strong and robust, the shoots somewhat thicker, and with the bark paler in colour than the Black Hamburgh; very free fruiting. *Leaves* large, dying off yellow.

FRUIT.—*Bunches* medium-sized, rather short, with broad shoulders, very often badly set, a great portion of the berries being imperfectly developed. *Berries* very large, roundish, inclining to oblate, having an uneven surface, giving them a hammered appearance. *Skin* thick, black, adhering to the flesh, covered with a dense bloom, very handsome. *Flesh* firm, often hollow at the core, coarse and harsh in flavour, excepting when highly ripened, when it is then sweet and sugary, but wanting in juiciness.

HISTORY, ETC.—This is a very old Grape, and has been much confounded with the Black Hamburgh, from which it is very distinct. It is more handsome in

appearance, and was at one time very extensively cultivated by Mr. Wilmot, market gardener at Isleworth, under the name of *Wilmot's Hamburgh*. The Mill Hill Hamburgh, which is sometimes regarded as synonymous, is a very distinct and much superior variety.

CULTURAL NOTES.—Requires much the same treatment as Black Hamburgh, but to set the berries properly it is the better for a rather warm temperature at that period. It is not much cultivated.

DUTCH SWEETWATER (26).—A round white Sweetwater Grape. *Season*: first early. *Merits*: first rate in quality, but so uncertain in setting as to be scarcely worth growing.

VINE.—*Growth* moderately vigorous, the young shoots inclining to be gross, and frequently not ripening well; fruitful. *Leaves* roundish, much serrated.

FRUIT.—*Bunches* small, short, with strong, broad shoulders, frequently very badly set, a great portion of the berries being imperfectly developed, stamens deflexed. *Berries* medium-sized, round. *Skin* thin, white, almost transparent, showing the venation, and with a slight bloom and tinges of russet when highly ripened. *Flesh* pale, sweet, juicy, tender, and very pleasant.

HISTORY, ETC.—This is the White Sweetwater of Speechly, and one of the oldest of Grapes, but it is now superseded, and is fast going out of cultivation.

CULTURAL NOTES.—This Grape has long been in repute as the best variety for open-air cultivation, but it is often confounded with the Royal Muscadine, which is a much more certain cropper and a superior variety.

EARLY AUVERGNE FRONTIGNAN.—Auvergne Frontignan.

EARLY BLACK JULY.—Black July.

EARLY GREEN MADEIRA.—Grove-End Sweetwater.

EARLY KIENZHEIM.—Grove-End Sweetwater.

EARLY LEIPSIC.—Grove-End Sweetwater.

EARLY WHITE MALVASIA.—Grove-End Sweetwater.

ESPERIONE.—Espiran.

ESPIRAN (78).—A round black Vinous Grape. *Season*: mid-season. *Merits*: quite third-rate.

SYN.—*Esperione.*

VINE.—*Growth* very free and vigorous, but never gross, the young shoots being rather slender than otherwise, of a reddish tinge, very rugose, and when ripe often having the bark distinctly streaked with pale and dark brown; very fruitful. *Leaves* deeply lobed and toothed, rugose, the stalks and venation of a reddish tinge.

FRUIT.—*Bunches* from nine to twelve inches long, tapering, with a large shoulder, always well set; stalk thin, but strong. *Berries* medium-sized, quite round, marked on the one side with a distinct suture, and often leaving the style point at the apex. *Skin* thick, very dark purple, and with a thick coating of bloom. *Flesh* firm, not very tender or juicy, and generally with a somewhat harsh flavour, except it be highly ripened when it becomes moderately sweet.

HISTORY, ETC.—This is an old Grape, long cultivated in this country. Mr. Aiton, of the Royal Gardens, Windsor, writing in the *Transactions of the Horticultural Society*, in 1818, recommends it very strongly, and a very correct illustration of it is there given. Subsequently, writers seem to have confused the Espiran with the Black Hamburgh, in consequence of which it attained a popularity which it did not deserve as an open-air Grape of high quality.

CULTURAL NOTES.—Requires treatment very similar to that of the Black Hamburgh to ripen its fruit properly. The plant is very hardy and vigorous, and the fruit colours long before it is completely ripe, which makes it appear a good outdoor variety, but it is never so sweet or pleasant to the taste as the Black Hamburgh under similar conditions.

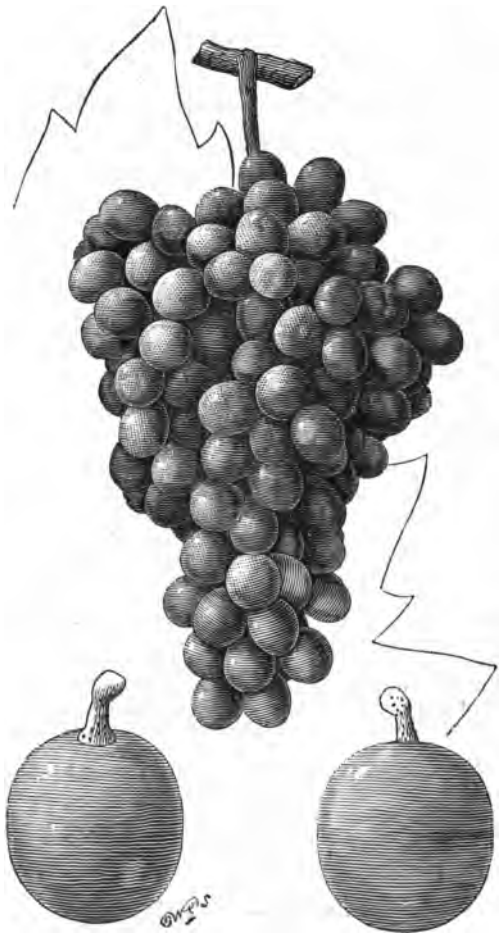

Plate XIII.—FOSTER'S SEEDLING.
(Bunch ½; berries natural size.)

EUGÉNIEN FRONTIGNAN.—Chasselas Musqué.

FARINEUX NOIR.—Miller's Burgundy.

FERDINAND DE LESSEPS (50).—An oval white Muscat Grape. *Season:* mid-season. *Merits:* first-class in quality, but too small for general cultivation.

VINE.—*Growth* strong and vigorous, producing strong, firm wood; moderately fruitful. *Leaves* large, deeply lobed, and cut; somewhat rugose.

FRUIT.—*Bunches* small, tapering, with little or no shoulder, and closely set. *Berries* below medium size, and oval in shape. *Skin* very thin and tender, of a pale amber, or golden colour. *Flesh* tender, juicy, remarkably sweet and pleasant, with a distinct aroma of the Strawberry, which scents the atmosphere of the house wherein it may be growing.

HISTORY, ETC.—This peculiar Grape was raised by the late Mr. Pearson, from a cross between Royal Muscadine and the Strawberry Grape, and was certificated by the Royal Horticultural Society in 1870.

CULTURAL NOTES.—Will ripen in the same temperature as the Black Hamburgh, and under similar conditions.

FLAME-COLOURED TOKAY.—Lombardy.

FLEMING'S PRINCE.—Trentham Black.

FOSTER'S SEEDLING (15)—Plate XIII.—An oval white Sweetwater Grape. *Season:* early, or first early. *Merits:* first-class in quality as an early Grape; a certain cropper, and one of the best white Grapes in cultivation.

VINE.—*Growth* free and vigorous, the wood moderately robust, ripening freely; always very fruitful. *Leaves* large, deeply toothed and lobed, slightly downy, and dying off yellow.

FRUIT.—*Bunches* medium-sized, well shouldered; stalks slender, always well set. *Berries* medium-sized, oval. *Skin* very thin, clear and transparent; at first of a greenish tinge, changing to a greenish yellow or nearly white when fully ripe, and occasionally having a tinge of cinnamon-russet on the most exposed side. *Flesh* tender and melting, very juicy and pleasantly flavoured; when allowed to hang long after ripening, the skin becomes thick and leathery, and the flesh hard.

HISTORY, ETC.—This fine Grape is a seedling raised by Mr. Foster, gardener to Lord Downe, Beningborough Hall, York, from a cross between the Black Morocco and the Sweetwater, and came from the same potful of seedlings as that which produced the variety called Lady Downe's Seedling. This was about the year 1835, but it was not sent out or distributed until many years afterwards, and its merits were not recognised until about 1860. It is now to be found in every collection.

CULTURAL NOTES.—This is one of the very finest of white Grapes, and one of the easiest to cultivate; it forces well, and succeeds along with the Black Hamburgh, or in good seasons will ripen well in an unheated house. We have seen it with Mr. Dunn, at Dalkeith, exceedingly good as a late variety.

FRANKENTHAL.—Black Hamburgh.

GARNSTON BLACK HAMBURGH.—Black Hamburgh.

GOLDEN BORDEAUX.—Royal Muscadine.

GOLDEN CHAMPION (17).—An oval white Sweetwater Grape. *Season:* early. *Merits:* first-class in quality, but constitutionally weak and uncertain.

VINE.—*Growth* somewhat gross, the young shoots being often very thick, soft, pithy, and badly ripened ; a moderate cropper. *Leaves* large, roundish, very deeply toothed, thick, and soft ; ripening off early of a deep yellow colour.

FRUIT.—*Bunches* large, well shouldered, ovate in outline ; stalk stout and fleshy, that of the berry being stout and warted. *Berries* very large, obovate, slightly pointed, in some cases round. *Skin* thin, clear pale greenish yellow, inclining to pale yellow when fully ripe. *Flesh* firm, very juicy, the flavour resembling somewhat that of a very sweet Black Hamburgh, and very pleasant to the palate. It is a somewhat shy setter, and the berries are often subject to the spot.

HISTORY, ETC.—This noble-looking Grape is a seedling raised by Mr. W. Thomson, when gardener to the Duke of Buccleuch, at Dalkeith. It was raised from a Grape that was a cross between Champion Hamburgh and Bowood Muscat, and received a First Class Certificate from the Royal Horticultural Society in 1868.

CULTURAL NOTES.—This fine Grape is somewhat difficult to cultivate ; it is a free grower in some places, but in others it makes very slow progress. It fruits better on young rods than on spurs. At Dalkeith it succeeded well with Mr. Thomson, grafted on the Black Hamburgh.

GOLDEN HAMBURGH (27).—A round white Sweetwater Grape. *Season :* early, but not suitable for forcing. *Merits :* second-rate, and unworthy of cultivation.

SYN.—*Busby's Golden Hamburgh, Luglienga Bianca.*

VINE.—*Growth* moderately free and robust, the young shoots somewhat soft and pithy, and ripening badly ; a moderate cropper. *Leaves* large, broad, and flabby, of a pale sickly green colour, as if in bad health, and dying off early.

FRUIT.—*Bunches* above medium size, with broad shoulders, very loose and straggling ; sets freely. *Berries* large, roundish, occasionally ovate. *Skin* thin, pale yellow in colour. *Flesh* tender, melting (might be termed squashy), sweet, but never rich. It requires to be eaten soon after becoming ripe, as it speedily becomes discoloured and loses flavour.

HISTORY, ETC. — This was stated to be a seedling raised by Mr. Bushy, gardener at Stockwood Park, Luton, and a cross between Stillward's Sweetwater and Black Hamburgh, but there is much doubt as to the accuracy of this statement. It is most probably an imported Grape. *Luglienga Bianca*, from Italy, as grown at Chiswick, proved similar in every respect, and this is most likely the proper name. It was sent out by Messrs. Veitch in 1857.

CULTURAL NOTES, ETC. — At one time this was the most popular of White Grapes, and was to be found in every collection. In the great Vinery at Chiswick it succeeded extremely well for a good many years, but latterly it has not been so satisfactory, seldom setting well, producing a great many small berries, and being of inferior quality. It does pretty well grafted on Black Hamburgh.

GOLDEN QUEEN (51).—An oval white Muscat Grape. *Season:* late; keeps well. *Merits :* second-rate ; scarcely worthy of cultivation.

VINE.—*Growth* remarkably strong and of fine vigorous constitution, the shoots strong, ripening well ; very fruitful. *Leaves* large, broad, deeply toothed, thick, deep green, with reddish foot-stalks, and remaining long in a fresh green state.

FRUIT.— *Bunches* medium-sized, long, regularly tapering, on very long but rather thin stalks ; sets thickly. *Berries* above medium size, ovate. *Skin* thick, of a pale greenish yellow colour, very often of an ashy paleness, and then not at all inviting. *Flesh* rather soft and squashy, sweetish, with a faint trace

of Muscat when well ripened, but generally very deficient in flavour. A very handsome Grape when well grown, rivalling in appearance the Muscat of Alexandria.

HISTORY, ETC.—This is a seedling raised by the late Mr. Pearson from Alicante, crossed by Ferdinand de Lesseps. It received a First Class Certificate from the Royal Horticultural Society in 1873.

GRIZZLY FRONTIGNAN (65).—A round, red, or tawny Muscat Grape. *Season:* mid-season. *Merits:* first-rate in quality, but rather small, and so uncertain as to be scarcely worthy of cultivation.

SYN.—*Muscat Gris, Muscat Rouge, Red Frontignan.*

VINE.—*Growth* moderately strong, free, and ripening freely; very fruitful. *Leaves* medium sized, deeply toothed, dying off yellow.

FRUIT.—*Bunches* medium-sized, rather long, somewhat cylindrical in shape, but occasionally shouldered; generally well set. *Berries* below medium size, round. *Skin* thin, membraneous, of a dull red or tawny colour on the side most exposed and paler on the shaded side; generally covered with a thin bloom. *Flesh* very firm, with a very rich, pleasant, and decided musky flavour. When kept hanging on the Vine after being ripe, the fruit is very apt to shrivel, but is then exceedingly rich and excellent.

HISTORY, ETC.—This is one of the oldest of our English Grapes, having been introduced by Sir William Temple in the year 1654, and was formerly cultivated in every collection, but is now seldom met with.

CULTURAL NOTES.—The great fault of this Grape has always been its tendency to shank. It grows freely, fruits and sets freely, and promises well till it approaches maturity, when it almost invariably shanks. Requires a warm Vinery to ripen it thoroughly.

GROMIER DU CANTAL (35).—A round, red, or tawny Sweetwater Grape. *Season:* early. *Merits:* second-rate; a very distinct characteristic variety, but scarcely worth cultivation.

VINE.—*Growth* very robust and strong, shoots gross, but ripening tolerably well; moderately fruitful. *Leaves* very large, deeply toothed, dying off yellow.

FRUIT.—*Bunches* large, very broadly shouldered, moderately well set; stalks thick and fleshy. *Berries* large, nearly three inches in circumference, having the appearance of a cross between Black Hamburgh and Sweetwater, round, or nearly so, on very stout, fleshy stalks. *Skin* thin, pale greenish yellow on the shaded side, splashed and dotted with dull red and brown and occasionally pink on the exposed sides. *Flesh* thin, very juicy, with a pleasant Sweetwater flavour.

HISTORY, ETC.—This Grape was sent to the Horticultural Society from Paris, and was, about thirty-five years ago, grown in the Society's Gardens at Chiswick, and at Trentham about the same period; but it is not now to be met with at either of these places, so far as we are aware. It has somehow become confused with De Candolle, from which, however, it is quite distinct, being twice as large in the berry, but not producing so large a bunch.

CULTURAL NOTES.—Will succeed in any house that is suitable for Black Hamburgh. It is liable to shanking, and so much so at times that the bunches are reduced to mere skeletons.

GROS BLEU.—Black Hamburgh.

GROS COLMAN (79)—Plate XIV.—A round black Vinous Grape. *Season:* late. *Merits:* very handsome in appearance, and valu-

able for late winter and market purposes; second-rate as to quality.

SYN.—*Gros Colmar, Gros Golman, Dodrelabi.*

VINE.—*Growth* free and vigorous, the shoots stout, with large prominent buds; very fruitful. *Leaves* large, broad, very downy, often presenting the appearance of flagging, and, very early in the season, assuming a rusty appearance, from which they change to a dull reddish hue.

FRUIT.—*Bunches* medium-sized, varying from one pound to three pounds or sometimes four pounds in weight, rather short and broad, with usually one large shoulder, giving the bunch a one-sided appearance; sets very freely; stalk long, thin, but very tough and strong. *Berries* round, very large, some examples measuring over four inches in circumference. *Skin* thick, tough, adhering to the flesh, jet-black when fully coloured, with a thick coating of bloom. *Flesh* firm, coarse, and generally with a very poor and indifferent flavour; but when highly ripened and commencing to shrivel, it is sweet and pleasant.

HISTORY, ETC.—There has been some doubt as to the origin of this Grape. The earliest record of it in this country is in the hands of Mr. Rivers, who received it from M. Leroy, of Angers. Subsequently, about 1861 or 1862, Mr. Standish, of Ascot, exhibited it at South Kensington, where it attracted notice from its handsome appearance; but it was some years later before it attained the great popularity it now enjoys, a great measure of which is due to Mr. W. Thomson, who was the first to recommend it and to grow it extensively for market purposes. As to the name, Gros Golman is that given in *Leroy's Catalogue* in 1860. In the *Journal of Horticulture*, December, 1878, it is stated that "in the Catalogue of Jacquermet-Bonnefont, of Annonay, for 1858, it is mentioned by the name of Gros Colmar, and in that of De Bavay for 1852, it is called Gros Colman. It can be traced," Dr. Hogg states, "through Germany, where it has been for many years known as Gros Kölner, and it is of this name that the French Gros Colman or Golman and Gros Colmar are corruptions." Herr Horvath informs us that "the Gros Colman Grape is a native of the Caucasus, where it is called "Dodrelabi." This Dodrelabi, received from Herr Horvath, fruited at Chiswick in 1891, and was considered by the Fruit Committee to be identical with the Gros Colman. Dodrelabi must therefore be accepted as the oldest and the most correct name for this Grape. In Hungary it has been known for a long time under the name of "Okörszem," and in Germany as "Ocksenauge." "It may be," Herr Horvath remarks, "that the name Colman is a corruption of the word Cölner, as stated by Dr. Hogg, but the Grosse Cölner Grape, which in German works relating to the Vine is called 'Blaße Urbanitraube,' is not identical with the Gros Colman, but is quite distinct. The word Colner is not derived from the town Cöln, but from Kohle, in allusion to the splendid bloom on the berries."

CULTURAL NOTES.—Free in growth and fruitful, this is one of the easiest of Grapes to cultivate, and to have in a very presentable condition by ordinary treatment; but to secure good quality it requires a long time to ripen, and a considerable amount of heat; in fact, almost similar treatment to that required for Muscats. The enormous size of the berries and great weight of the bunches necessitates some care in thinning and not overcropping—an error of treatment which is soon apparent in the want of colour.

GROS COLMAR.—Gros Colman.

GROS COULARD.—Prolific Sweetwater.

GROS GOLMAN.—Gros Colman.

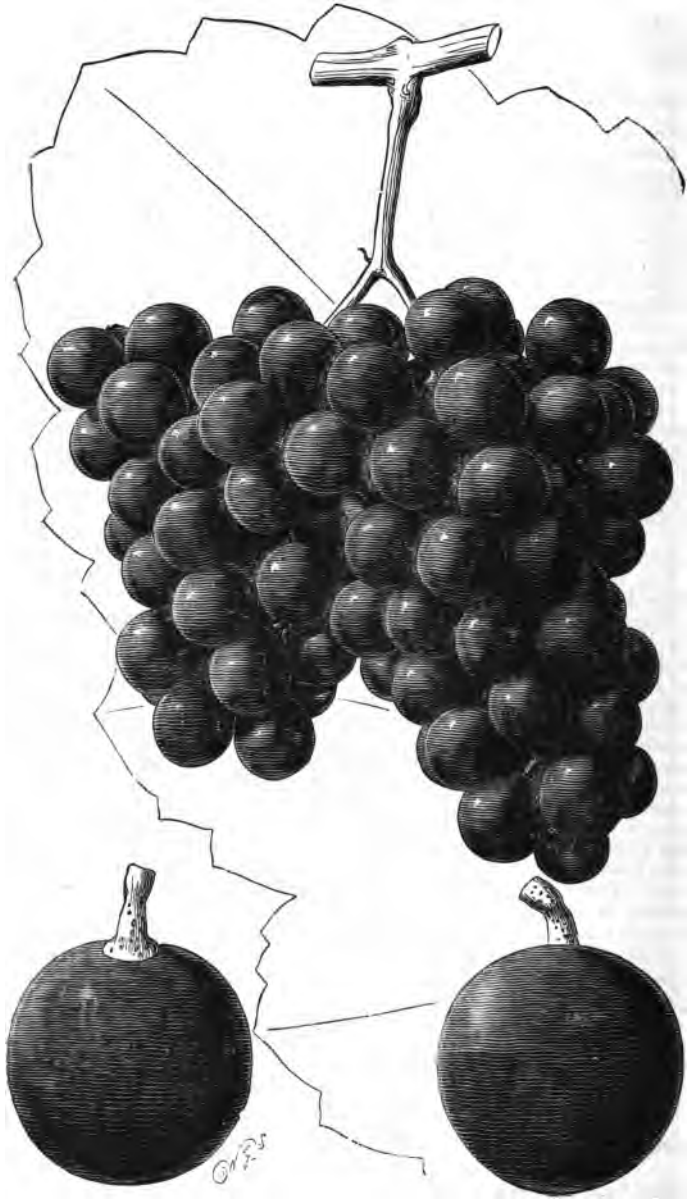

Plate XIV.—Gros Colman.
(Bunch ½; berries natural size.)

GROS GUILLAUME (80)—Plate XV. A round black Vinous Grape. *Season:* late; from Christmas to March. *Merits:* very handsome in appearance on account of the size of the bunches; second-rate in quality, excepting when highly ripened.

SYN.—*Pennington Hall Hamburgh, Seacliffe Black, etc.*

VINE.—*Growth* very strong and vigorous, rapidly attaining to a great size; rather uncertain as to fruiting, some plants showing abundantly, others scarcely at all. *Leaves* large, dying off early, of a reddish colour.

FRUIT.—*Bunches* enormously large, two feet and upwards in length, and fully more across the shoulders, and weighing from five pounds to ten pounds, and sometimes twenty pounds each; shoulders broad; very regularly tapering in form, compact; free-setting. *Berries* medium-sized, round or slightly ovate at times. *Skin* membraneous, of deep black colour, with a fine bloom. *Flesh* tender or moderately so, juicy, but possessing little flavour, excepting when highly ripened.

HISTORY, ETC. — The better known designation of this Grape is that of Barbarossa, under which name it is to be found in nearly every collection, but according to the best authorities, this is incorrect, the true Barbarossa, it is stated, being — as its name would imply — a red or grizzly-coloured Grape. Although the true Barbarossa is mentioned in Hogg's *Fruit Manual*, we have never met with it in cultivation. The Gros Guillaume was first prominently brought under notice by Messrs. Butcher, of Stratford-on-Avon, about forty years ago. It is now in general cultivation, and has several times appeared under new names; while reputed new and improved varieties have frequently been submitted.

CULTURAL NOTES.—In regard to fruiting, this is one of the most uncertain of Grapes, and much has from time to time been written on the subject. Sometimes only a few, frequently only one bunch is produced by a large Vine, and this is generally a very large one. In other cases, some Vines will produce bunches as freely as the Black Hamburgh. In the large conservatory at Chiswick it fruits with remarkable freedom at all times. It succeeds best treated on the long-rod system. Some remarkably fine examples of this Grape have been produced by grafting on the Black Hamburgh. The largest bunches have been those grown by Mr. Roberts, gardener at Charleville Forest, Ireland, one exhibited in 1877 weighing twenty-three pounds five ounces. It is best suited for a late Grape, and, to ripen it thoroughly well, so as to have it of good quality, it should receive nearly as much heat as the Muscats.

GROS MAROC (72) —Plate XVI.— An oval black Vinous Grape. *Season:* mid-season. *Merits:* extremely handsome, the berries being covered with a dense dark bloom.

SYN.—*Marocain.*

VINE.—*Growth* very strong and robust, the shoots large, but firm and ripening freely; moderately fruitful. *Leaves* large, deeply serrated.

FRUIT. — *Bunches* medium-sized, strongly shouldered, with stout stalks, sets freely. *Berries* large, ovate in shape, of a very dark plum-colour, with a thick bloom. *Flesh* firm, yet juicy, with a somewhat disagreeable acid flavour.

HISTORY, ETC.—Introduced in 1855 by the late Mr. Rivers, from M. Vibert, of Angers, this Grape remained comparatively unknown for many years, until proper attention was directed to its merits by Mr. T. F. Rivers, who obtained

Plate XV. — GROS GUILLAUME.
(Bunch ½; berries natural size.)

for it a First Class Certificate from the Royal Horticultural Society. It has been much confused with the Gros Damas Noir and Black Morocco, from both of which it is, however, quite distinct. A variety named Cooper's Black greatly resembles Gros Maroc, if it be not identical.

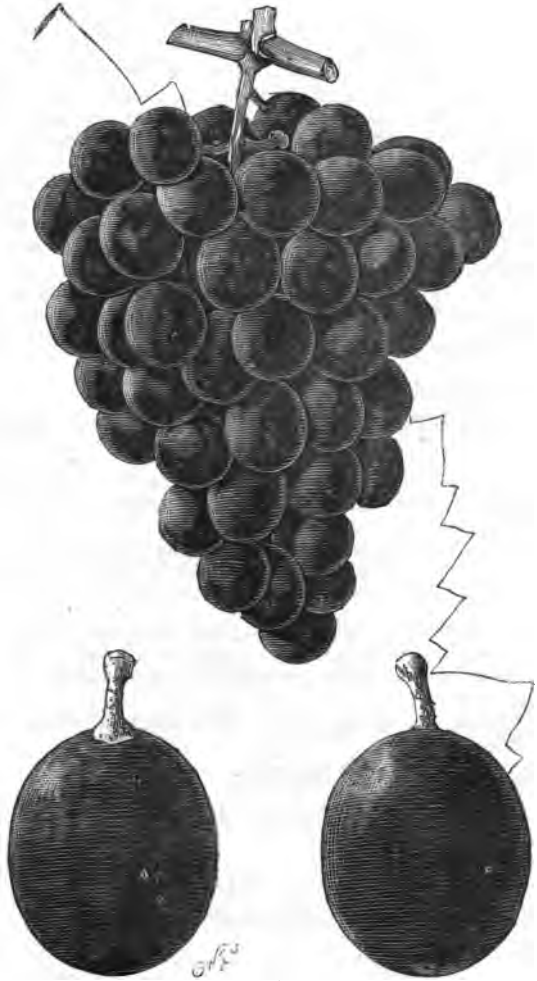

Plate XVI.—GROS MAROC.
(Bunch ½; berries natural size.)

CULTURAL NOTES.—This Grape is largely cultivated by Mr. Ward, at Bishop's Stortford, and by Messrs. Rivers, and is much esteemed for its free-fruiting properties and fine constitution. It always colours freely and well. It is somewhat difficult to establish, but, when once it is so, it grows vigorously.

GROVE-END SWEETWATER (16).—An oval white Sweetwater Grape. *Season:* first early; one of the earliest Grapes in cultivation. *Merits:* first-class as an early out-door Grape.

SYN.—*Early Green Madeira, Early White Malvasia, Early Leipsic, Burchardt's Amber Cluster, Early Kienzheim.*

VINE.—*Growth* free and vigorous, although not robust; free-fruiting.

FRUIT.—*Bunches* small, from six inches to eight inches long, loose or straggling; setting freely. *Berries* small, ovate. *Skin* thin, very clear and transparent, greenish white, becoming amber when fully ripe, and retaining a thin bloom. *Flesh* very tender and juicy, with a remarkably sweet, rich, and pleasant flavour.

HISTORY, ETC.—This Grape is so named from Grove End, St. John's Wood, the residence of William Atkinson, Esq., who imported it and grew it under that name, as described in the *Transactions of the Horticultural Society* in 1821. It was subsequently grown at Chiswick, and sent out from there under the name of *Burchardt's Amber Cluster.*

CULTURAL NOTES.—Will succeed in any cool Vinery or orchard-house, and is specially well adapted for cultivation on the open wall.

HAMPTON COURT.—Black Hamburgh.

HORSFORTH'S SEEDLING.—Black Morocco.

INGRAM'S HARDY PROLIFIC MUSCAT (37).—An oval black Muscat Grape. *Season:* early. *Merits:* second-rate.

VINE.—*Growth* somewhat slender, the shoots small, but ripening freely; moderately fruitful. *Leaves* small, rugose, deeply serrated, with reddish stalks and venation.

FRUIT.—*Bunches* medium-sized, long, tapering, and setting freely. *Berries* medium-sized, of an oval shape. *Skin* quite black, with a thick blue bloom. *Flesh* firm, moderately juicy, sweet, and pleasant, with a slight trace of Muscat flavour.

HISTORY, ETC.—This is a seedling raised in 1857 by the late Mr. Ingram, gardener to Her Majesty at Frogmore, and was in much repute for some years as a Grape suitable for out-door culture, as having a Muscat flavour. It is not now cultivated to any extent.

CULTURAL NOTES, ETC.—Free growing, and fruits readily in any ordinary Vinery or greenhouse.

JOHN DOWNIE.—Alnwick Seedling.

JOSLING'S ST. ALBANS.—Chasselas Musqué.

JULY.—Black July.

JULY FRONTIGNAN (44).—A round black Muscat Grape. *Season:* first early. *Merits:* first-class as an out-door Grape.

SYN.—*Muscat de Juillet.*

VINE.—*Growth* free and vigorous, producing small but well-ripened shoots; fruits freely.

FRUIT.—*Bunches* small, compact, and setting freely. *Berries* small and round. *Skin* dark purple, with a thick bloom. *Flesh* very juicy, sweet and pleasant, with a slight Muscat flavour.

HISTORY, ETC.—Introduced by the late Mr. Rivers.

CULTURAL NOTES.—Very suitable for cultivation on the open wall, as it ripens early and is of good constitution.

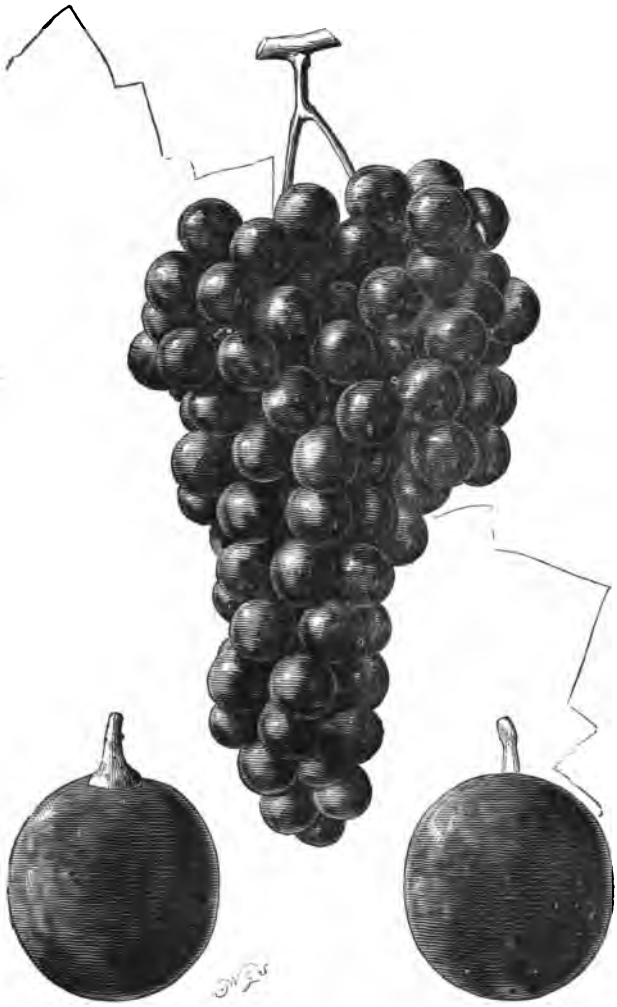

Plate XVII.—LADY DOWNE'S SEEDLING.
(Bunch ½; berries natural size.)

KEMPSEY ALICANTE.—Black Morocco.
KISH MISH ALI.—Black Hamburgh.

KNEVETT'S BLACK HAMBURGH.—Black Hamburgh.

LADY DOWNE'S SEEDLING (81) Plate XVII.—A round, black Vinous Grape. *Season*: late. *Merits*: first-rate; specially valuable for late winter use.

VINE.—*Growth* strong and robust, the wood ripening freely, the ripened shoots frequently downy; very free fruiting; late in commencing growth. *Leaves* roundish, deeply toothed, downy, dying off reddish, or sometimes yellow, the leaf-stalks very downy, and with a tinge of red.

FRUIT.—*Bunches* long, from eight to twelve inches, tapering, with generally one large irregular shoulder; closely and freely set, fig. 56, p. 195. *Berries* large, roundish, or sometimes ovate, frequently with a distinct suture across the apex, showing the form of the seeds. *Skin* thick, tough, and leathery, deep purplish black when properly coloured with a thick bloom, but frequently reddish purple near to the stalk. *Flesh* dull green in colour, thick, and firm, with a somewhat harsh, acid flavour, excepting when well ripened, when it becomes brisk or sparkling, sweet, and rich.

HISTORY, ETC.—This truly excellent and popular Grape was long in having its merits recognised. It was raised by Mr. Foster, gardener to Viscount Downe, Beningborough Hall, York, about the year 1835, and was first exhibited before the Horticultural Society in 1845. Eight years after this, viz., in 1853, it was sent out by Messrs. Backhouse, of York; but it was still many years before its great merits were fully recognised, as one of the best late-keeping Grapes. In 1858, the following interesting letter appeared in the *Gardeners' Chronicle*, p. 70, from Mr. Saul, giving the history of this Grape, as received from Mr. Foster. "Lady Downe's Seedling Grape was raised from the Black Morocco, crossed by the Sweetwater, twenty-three years ago. The most singular thing was that from the same seeds there should have been two varieties—a black Grape and a white (this was subsequently named Foster's Seedling). The bunch of Grapes these were raised from, Lady Downe had for her lunch, and after eating the Grapes, she sent to the gardens for a pot of mould to sow the seed in. After the plants were up, and the seed-leaves expanded, they were handed over to me to take charge of them. I don't know whether I ought to claim the credit of raising it or not. The crossing of the varieties was my doing."

CULTURAL NOTES.—This very valuable Grape is of easy cultivation; it will grow and ripen its fruit in any ordinary Vinery, but a rather high temperature is required to set the berries properly. It forces well but requires considerable time to develop its proper flavour. The berries at certain stages are very liable to scalding, and the young shoots to burning on bright mornings in a close atmosphere. The fruit keeps well, and will hang fresh on the Vine until March.

LADY HUTT (18).—A round white Sweetwater Grape. *Season:* mid-season. *Merits:* first-class quality, and rather handsome.

VINE.—*Growth* moderately robust, shoots ripening freely. *Leaves* large, not much lobed, die off yellow.

FRUIT.—Bunches below medium size, rather short, well and freely set. *Berries* medium size, roundish. *Skin* thin, clear pale yellow, rather pretty. *Flesh* firm, juicy, with an exceedingly pleasant rich Sweetwater flavour.

HISTORY.—Raised by Mr. Myles, gardener to Lady Hutt, Appley Towers, Ryde, from Gros Colman crossed by Alicante. First Class Certificate, Royal Horticultural Society, 1890.

LE CŒUR.—Black Morocco.

LE MUNIER.—Miller's Burgundy.

LIERVAL'S FRONTIGNAN.—Muscat de Lierval.

LOMBARDY (36).—A round, red, or grizzly Sweetwater Grape. *Season:* mid-season, or rather late. *Merits:* second-rate.

SYN.—*Flame-coloured Tokay, Red Rhenish, Wantage.*

VINE.—*Growth* strong and vigorous, but not very free-fruiting. *Leaves* large.

FRUIT.—*Bunches* very large, from twelve to twenty inches in length, broadly shouldered, very regular in form, somewhat loosely but well set, very handsome. *Berries* medium-sized, roundish. *Skin* pale red or grizzly. *Flesh* pale, moderately firm, sweet, but not rich.

HISTORY, ETC.—This Grape is of Continental origin. It was, however, singularly originated in this country also, having been raised from the seed of a dried raisin, and grown on the end of a cottage at Wantage, whence it was received by Mr. Wilmot, of Isleworth, and exhibited before the Horticultural Society in 1821.

CULTURAL NOTES.—Will succeed in any ordinary Vinery.

LONG NOIR D'ESPAGNE.—Trentham Black.

LUGLIENGA BIANCA.—Golden Hamburgh.

MADEIRA FRONTIGNAN (66).—A round, red, or grizzly Muscat Grape. *Season:* early. *Merits:* excellent in quality.

SYN.—*Muscat Rouge de Madère, Muscat Noir de Madère.*

VINE.—Moderately free and vigorous in *growth*, shoots always ripening freely, very prolific or fruitful. *Leaves* small, roundish.

FRUIT.—*Bunches* small or below medium size, compact; closely and well set. *Berries* medium-sized, round. *Skin* thick, reddish purple or grizzly. *Flesh* firm, yet juicy and very rich, having a very decided Muscat flavour.

HISTORY, ETC.—Imported from France some years since by Messrs. Rivers and the Royal Horticultural Society. Fruited at Chiswick, but is not often to be met with.

CULTURAL NOTES.—Will succeed in any house suitable for the Black Hamburgh, and ripens about the same time.

MADELEINE ROYALE (19).—An oval white Sweetwater Grape. *Season:* early; ripening in advance of the Black Hamburgh. *Merits:* second quality, but worthy of culture as a free-fruiting early Grape.

VINE.—*Growth* strong and vigorous, very similar to that of the Black Hamburgh, the shoots strong, ripening freely; very fruitful. *Leaves* similar to those of the Black Hamburgh.

FRUIT.—*Bunches* medium-sized, rather short, but broadly and stoutly shouldered, well set. *Berries* medium-sized, ovate. *Skin* thin, almost transparent, whitish or pale green, somewhat liable to crack about the ripening period. *Flesh* thin, pale, briskly sweet and pleasant, but not rich. It somewhat resembles in appearance Foster's White Seedling but ripens earlier, and is not quite so large as that variety. A pretty Grape.

HISTORY, ETC.—Received by the Royal Horticultural Society from M. Leroy, Angers. Has been grown at Chiswick for many years in an unheated orchard-house.

Plate XVIII.—MADRESFIELD COURT.
(Bunch ½; berries natural size.)

CULTURAL NOTES.—Succeeds well in any ordinary Vinery, and will ripen in a cool greenhouse; but in cold or damp weather, the skin being thin and tender, it is liable to crack and decay.

MADRESFIELD COURT (38).—Plate XVIII.—An oval black Muscat Grape. *Season:* early. *Merits:* first-class, excellent in quality, and very handsome.

VINE.—Moderately strong in *growth*, very free, the shoots always ripening freely, producing prominent dark brown buds, and generally covered with a thin coating of down; very fruitful. *Leaves* medium-sized, rugose, deep green, sharply or deeply lobed; leaf-stalks and venations reddish. The leaves die off crimson, and are very beautiful.

FRUIT.—*Bunches* above medium size, long, very regularly tapering, the point often forked; shoulders generally small, stalk stout; weight averaging from two to four pounds; always freely and well set. *Berries* large, sometimes very large, of a long ovate shape, on stout foot-stalks, very regular. *Skin* tough and membraneous, of a dark purplish shade generally, seldom quite black, and covered with a very dense blue bloom, like some varieties of Plums. *Flesh* thick, greenish, very tender, sweet and rich; generally, but not always, with a very distinct Muscat flavour. Extremely handsome.

HISTORY, ETC. — A hybrid, raised by the late Mr. Cox, gardener to Earl Beauchamp, at Madresfield Court, Worcestershire, by crossing Muscat of Alexandria with the Black Morocco. It was awarded a Certificate by the Royal Horticultural Society in 1868, and was subsequently sent out by Messrs. Lee, Hammersmith.

CULTURAL NOTES.—Remarkably easy of cultivation, possessing a fine free constitution. Being at first recommended as a late Grape, many failed in its cultivation by giving it too much heat; whereas it is actually an early Grape, is best suited for early work, and requires less heat than the Black Hamburgh. In some places it has succeeded remarkably well in a cool orchard-house. If allowed to hang long, the berries are somewhat liable to crack. The finest examples we have seen were grown by Mr. Roberts, late of Gunnersbury. It is now being largely grown as an early Grape for the London Market.

MAJOR MORAY'S.—West's St. Peter's.

MALMSEY MUSCADINE.—Ciotat.

MALVOISIE NOIRE.—Œillade Noire.

MAROCAIN.—Gros Maroc.

MEREDITH'S ALICANTE.—Alicante.

MEURTHE FRONTIGNAN (46).—A round black Muscat Grape. *Season:* mid-season or general crop. *Merits:* quality excellent; one of the best of its class.

SYN.—*Muscat Noir de Meurthe.*

VINE.—*Growth* moderately vigorous, the shoots ripening freely; free-fruiting. *Leaves* small, rounded, not deeply lobed, but deeply toothed; dying off reddish.

FRUIT.—*Bunches* medium-sized, cylindrical, sometimes slightly shouldered, very close and compact, well set. *Berries* round, medium-sized, larger than those of the Black Frontignan, on short, thick, fleshy stalks. *Skin* purplish black, covered with a heavy bloom, and with a very prominent style-point. *Flesh* firm, crackling, rich, brisk and juicy, with a very distinct Muscat flavour.

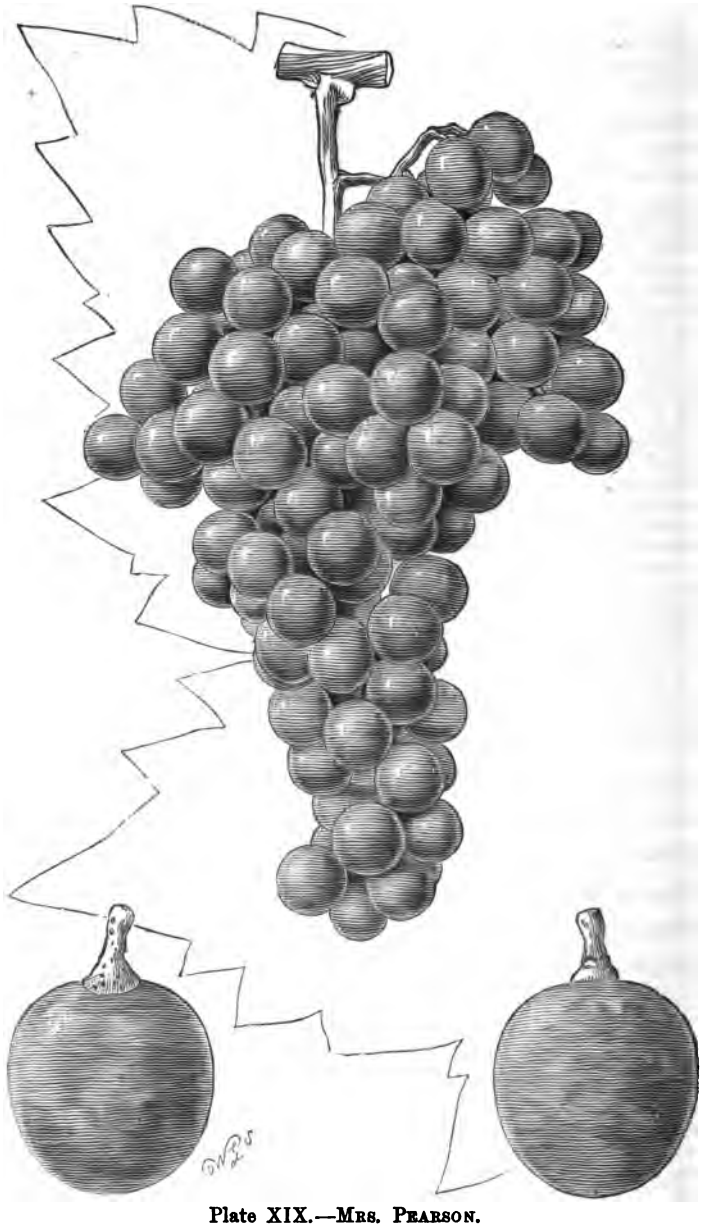

Plate XIX.—Mrs. Pearson.
(Bunches ½; berries natural size.)

HISTORY, ETC.—Grown in the collection of the Royal Horticultural Society at Chiswick, having been received from M. Leroy, of Angers.

CULTURAL NOTES.—Will succeed under ordinary treatment, or in a cool house.

MILHAUD DU PRADEL.—Œillade Noire.

MILLER GRAPE.—Miller's Burgundy.

MILLER'S BURGUNDY (9).—A round black Sweetwater Grape. *Season:* early. *Merits:* very hardy; excellent for the open wall.

SYN.—*Farineux noir, Le Munier, Miller Grape.*

VINE.—*Growth* strong and vigorous, the young shoots ripening freely; very fruitful, producing three to four bunches on each shoot. *Leaves* thick and leathery, very downy, almost white; hence called the *Miller Grape.*

FRUIT.—*Bunches* small, short, compact, very thickly and freely set. *Berries* small, roundish. *Skin* thin, purplish black, covered with a fine bloom. *Flesh* dark, juicy, with a sweet pleasant flavour.

HISTORY, ETC.—One of the very oldest of Grapes cultivated in this country; found by Sir Joseph Banks in the remains of an ancient Vineyard at Tortworth, Gloucestershire. Figured in the *Pomological Magazine*, II., p. 56, and still to be met with against walls and cottages as an out-door Vine.

CULTURAL NOTES.—Suitable for planting against a warm wall, where, in good seasons, it ripens freely.

MILL-HILL HAMBURGH (10).—A round black Sweetwater Grape. *Season:* general crop; not adapted for early forcing, or for late keeping. *Merits:* first-class quality.

SYN.—*Champion Hamburgh, Black Champion.*

VINE.—*Growth* very strong, almost gross, the young shoots soft and thick, and frequently not ripening well, so that the Vine often becomes bare of shoots; shy fruiting; *Leaves* very large, pale green, and very early assuming a flaccid, sickly yellow appearance, as if in bad health; this being a very distinctive characteristic.

FRUIT.—*Bunches* medium-sized, never very large, broadly shouldered, the stalks very thick and fleshy; rather thinly and often indifferently set. *Berries* very large, quite round. *Skin* thin, almost transparent, reddish black, seldom quite black, with a thin bloom. *Flesh* very tender, melting, juicy, sweet, rich, and pleasantly flavoured; superior to the Black Hamburgh.

HISTORY, ETC.—We have failed to trace the direct origin, or history of this noble Grape. It has been in cultivation in various gardens for many years, and is confused with the coarse hard-fleshed Dutch Hamburgh, the one very frequently passing for the other.

CULTURAL NOTES.—Requires much the same treatment as the Black Hamburgh in regard to temperature, etc., but fruits best when pruned on the long-rod system. The skin being very thin, the berries do not keep long after becoming ripe.

MRS. PEARSON (61)—Plate XIX.—A round white Muscat Grape. *Season:* late—late in ripening, keeps well. *Merits:* quality first-class.

VINE.—Very strong and vigorous in *growth*, the wood ripening freely; fruitful. *Leaves* medium-sized, thick, and leathery, deeply-lobed and toothed, with reddish petioles and venation.

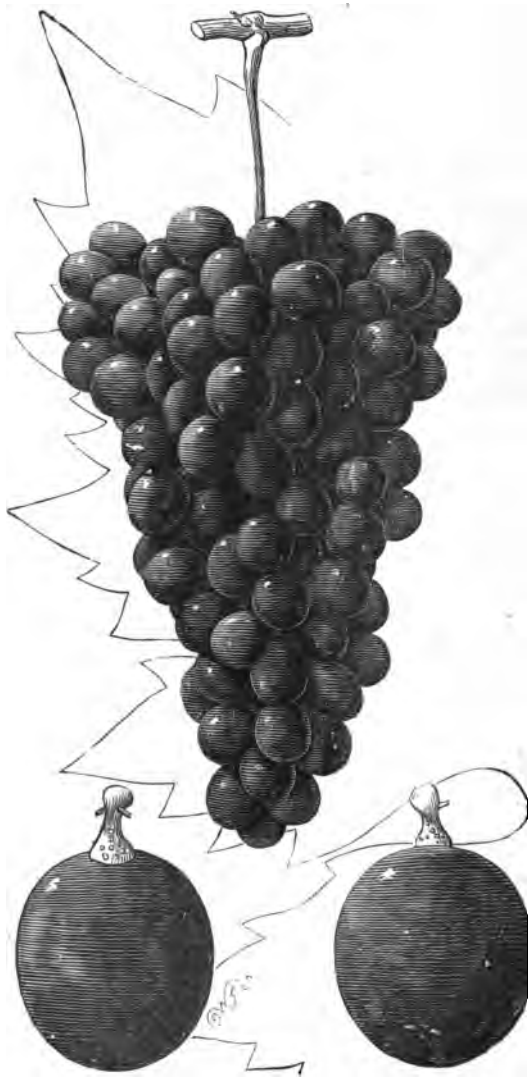

Plate XX.—Mrs. Pince's Black Muscat.

(Bunch ½; berries natural size.)

FRUIT.—*Bunches* above medium size, with large shoulders, tapering, on very strong foot-stalks; freely set. *Berries* roundish, or nearly so. *Skin* thick, leathery, deep green, assuming an amber tinge when quite ripe. *Flesh* thick or firm, juicy, sweet, and with a pleasant strong Muscat flavour.

HISTORY, ETC.—Raised by Mr. Pearson from Black Alicante crossed with Ferdinand de Lesseps, and awarded a First Class Certificate by the Royal Horticultural Society in 1874. It is not so much cultivated as it really deserves.

CULTURAL NOTES.—Requires as much heat and time to ripen as the Muscat of Alexandria. Should be grown in a warm Vinery.

MRS. PINCE (40)—Plate XX.—An oval black Muscat Grape. *Season:* late. *Merits:* first-class, especially valuable for late use.

SYN.—*Mrs. Pince's Black Muscat.*

VINE.—*Growth* very strong and vigorous, the shoots ripening freely; moderately fruitful. *Leaves* strong and leathery, very rugose, with reddish stalks and venation, and covered with down.

FRUIT.—*Bunches* generally very large, long, tapering, and often terminating in a broad forked or fasciated point; compact, requires care in setting. *Berries* medium-sized, long ovate, on very stout warted foot-stalks. *Skin* tough, thick, deep purplish black, with a very thick blue bloom. *Flesh* firm, crackling, very rich and sweet, having a strong Muscat flavour.

HISTORY, ETC.—The seed of this Grape was sown by the late Mrs. Pince, of the Exeter Nurseries, shortly before her death. The Vine fruited in 1863, and was awarded a First Class Certificate by the Royal Horticultural Society. It is now pretty generally cultivated, more especially, perhaps, in the south-western counties.

CULTURAL NOTES.—Requires treatment very similar to that of the Muscat of Alexandria. It takes a considerable time to ripen thoroughly, but will keep long in good condition, and with less care than most other Grapes.

MONEY'S WEST'S ST. PETER'S.—West's St. Peter's.

MOROCCO.—Black Morocco.

MOROCCO PRINCE (73).—An oval black Vinous Grape. *Season:* late. *Merits:* second-rate; valuable on account of its keeping qualities.

VINE.—*Growth* very strong and vigorous, the shoots ripening freely; moderately fruitful. *Leaves* medium-sized, deeply toothed, rugose, with reddish stalks and venation.

FRUIT.—*Bunches* of medium size, on long, strong foot-stalks, with strong shoulders; setting freely. *Berries* medium-sized, short ovate, on strong stalks. *Skin* thin, membraneous, generally of a purplish red colour, but sometimes black, and with a thin bloom. *Flesh* firm, juicy, sweet, with a very brisk, sparkling vinous flavour.

HISTORY, ETC.—Received by the Royal Horticultural Society about thirty-five years ago, as a seedling between Black Prince and Black Morocco, hence called Morocco Prince.

CULTURAL NOTES.—Succeeds under the same treatment as the Black Hamburgh.

MUSCAT OF ALEXANDRIA (52)—Plate XXI.—An oval white Muscat Grape. *Season:* late; will keep in good condition long after

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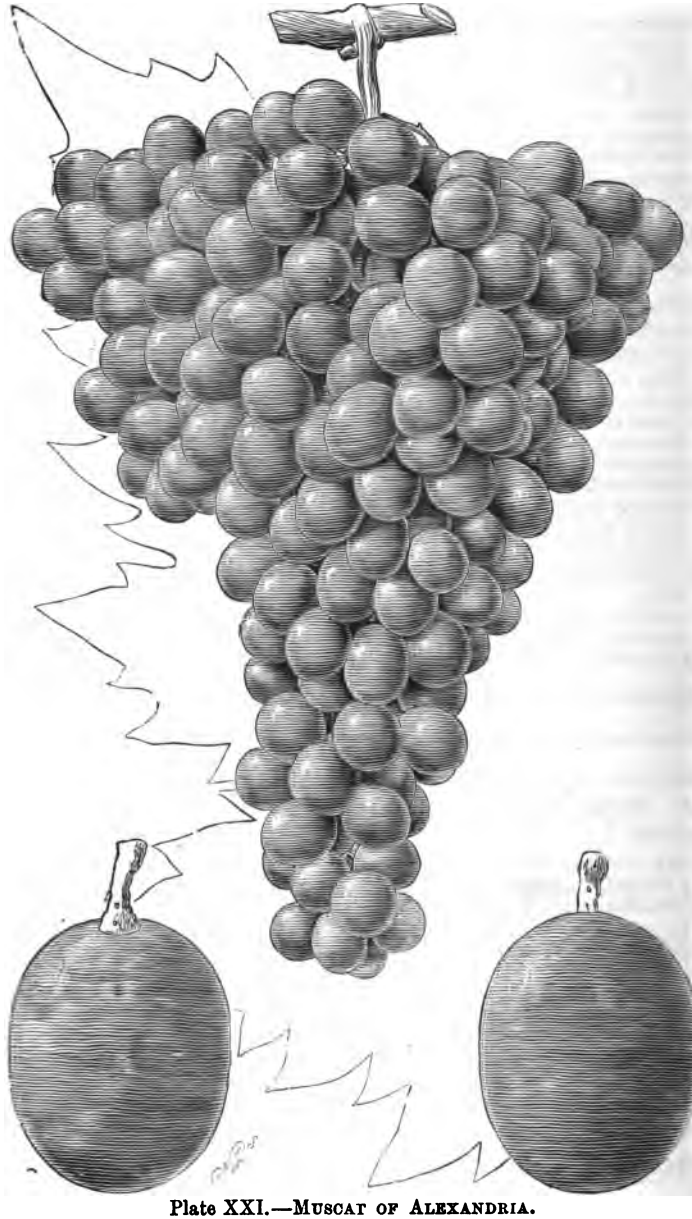

Plate XXI.—Muscat of Alexandria.
(Bunch ½; berries natural size.)

ripening. *Merits:* first-class; the most handsome and valuable Grape in cultivation.

SYN. — *Archerfield Early Muscat, Charlesworth Tokay, Cabas à la Reine, Muscat Escholata, Bowood Muscat, Lunel Muscat, Muscat Romain, Passe Muscat, Tottenham Park Muscat, Tyninghame Muscat, etc.*

VINE.—Strong and robust in *growth*, and of a vigorous, healthy constitution, the young shoots moderately strong; very free-fruiting. *Leaves* of medium size, deeply lobed, somewhat rugose, commencing early to decay, and becoming yellow round the edges; the leaf-stalks and venation reddish.

FRUIT.—*Bunches* very long, from twelve to twenty inches, tapering, and often strongly shouldered; weight from two pounds to four pounds, and frequently six pounds; a somewhat shy setter. *Berries* very large, long ovate, on stout stalks. *Skin* rather thick, clear greenish yellow, or when highly ripened pale amber, and sometimes with a flush of cinnamon where much exposed; very handsome. *Flesh* firm, crackling or fleshy, exceedingly sweet, rich, and with a strong Muscat flavour.

HISTORY, ETC.—One of the oldest and still the very best of Grapes, and one common to almost every garden. The number of synonyms applied to this Grape, and the number of new, early, hardy, and so-called improved varieties that have been introduced are, perhaps, greater than in the case of any other variety. In the north of England, it used very commonly to be called *Charlesworth Tokay*. For many years *Bowood Muscat* was considered a greatly-improved variety, and *Muscat Escholata* had the reputation of being much larger; but a complete test of all these reputed varieties being made at Chiswick, the only other distinct variety was the Canon Hall Muscat. One of the largest Vines existing is that at Harewood House, Leeds, which was planted by Mr. Chapman in 1783, and completely fills a house sixty feet long by eighteen feet wide, and bears an average crop of three hundred bunches.

CULTURAL NOTES.—No Grape better rewards special culture than this. It is seldom found to succeed well in a mixed collection. Although the Vine is quite hardy, and fruits freely in the open air, it is found to require a warmer temperature and drier atmosphere than most other varieties to set the berries properly. Thus special care is required in setting, and a higher temperature is also requisite to ripen the fruit thoroughly. Unlike Black Grapes, the Muscat of Alexandria is much benefited by having the fruit exposed to the direct influence of the sun.

MUSCAT D'AOÛT.—August Frontignan.

MUSCAT BIFÈRE (54). — An oval, white Muscat Grape. *Season:* early. *Merits:* second-rate.

VINE.—Moderately robust in growth, and with a good constitution; fruits freely. *Leaves* medium-sized, roundish.

FRUIT.—*Bunches* long, tapering, with broad shoulders; freely set. *Berries* medium-sized, roundish oval. *Skin* clear, pale greenish yellow. *Flesh* firm, juicy, sweet, and with a very decided Muscat flavour.

HISTORY, ETC.—Received from M. Andre Leroy, of Angers, and fruited at Chiswick.

CULTURAL NOTES.—Will succeed in any ordinary Vinery.

MUSCAT BLANC.—White Frontignan.

MUSCAT CHAMPION (67).—A round, red, or grizzly Muscat Grape. *Season:* mid-season; will not keep long after being ripe. *Merits:* first-class in quality, and very handsome.

SYN.—*Champion Hamburgh Muscat.*

VINE.—*Growth* somewhat gross, the shoots often ripening badly, like those of the Mill Hill Hamburgh; shy-fruiting. *Leaves* large, deeply serrated, flabby, dying off yellow.

FRUIT.—*Bunches* medium-sized, broadly shouldered, on gross fleshy stalks; an imperfect setter, many of the berries, although attaining a fair size, having no seeds. *Berries* very large, round. *Skin* thin, tender, of a dark reddish or grizzly colour, seldom black. *Flesh* melting, very juicy, rich and sweet, with a strong Muscat flavour.

HISTORY, ETC.—Raised by Mr. Melville, gardener to the Earl of Rosebery, at Dalmeny Park, Edinburgh, about the year 1858, by crossing Mill Hill Hamburgh with Canon Hall Muscat, possesses the characteristics of both parents. It was sent out by Messrs. Veitch & Sons.

CULTURAL NOTES.—A somewhat difficult Grape to cultivate, being slow in commencing to grow, and producing gross, badly-ripened wood. At Sandringham, Mr. Carmichael was particularly successful in its cultivation; and Mr. Harrison Weir grew it with great success in his low ground-vineries at Brenchley, Kent.

MUSCAT ESCHOLATA.—Muscat of Alexandria.

MUSCAT EUGENIEN.—Auvergne Frontignan.

MUSCAT FLEUR D'ORANGER.—Chasselas Musqué.

MUSCAT GRIS.—Grizzly Frontignan.

MUSCAT OF HUNGARY (53).—An oval white Muscat Grape. *Season:* mid-season. *Merits:* first-class in quality.

SYN.—*Muscat Daroczy, Muscat de l'Archiduc Jean, Péczi szagos, etc.*

VINE.—*Growth* moderately strong, ripening freely, having a fine vigorous constitution, fruitful. *Leaves* resembling Muscat of Alexandria, dying off yellow.

FRUIT.—*Bunches* of small size, always well set. *Berries* below medium size, ovate. *Skin* thin, pale greenish yellow. *Flesh* firm, yet juicy, with a very pronounced and exceedingly pleasant Muscat flavour. We have received fruit of this sort from Herr Horvath, of Fünfkirchen, Hungary, who states that it is the best and latest keeping table Grape grown in Hungary, retaining its Muscat flavour longer than the Muscat of Alexandria. Grown at Chiswick, this has proved to be the very richest of Muscat Grapes, and hangs remarkably long in fresh condition.

HISTORY, ETC.—Herr Horvath says that this Grape has been grown in the mountains of Funfkirchen for many years and from thence distributed. It is best known there under the name of *Péczi szagos*, Peczi being Hungarian for Funfkirchen, and szagos signifying "sweet-scented." It is erroneously called Muscat of Alexandria. The Director of the School of Vine-culture there calls it the Small-berried Muscat of Alexandria. In Marburg it is often called *Muscat Dumuscener*, which is incorrect, this being the German name for the Muscat of Alexandria. It is sometimes called *Muscat Daroczy*, in compliment to M. Daroczy,

who distributed it largely ; and it has also been called *Erzherzog Johanntraube* by a Styrian grower named Trummer, who got it mixed with other sorts, this latter name being translated by the French into *Muscat de l'Archiduc Jéan*, and by the Italians into *Moscato del Archiduca Giovanni*. In spite of the many names it possesses this sort is almost unknown out of Hungary, which, considering its high reputation, is somewhat singular.

CULTURAL NOTES.—Being of good hardy constitution will succeed under the ordinary treatment required for the Black Hamburgh.

MUSCAT GRIS.—Grizzly Frontignan.

MUSCAT HAMBURGH (39)—Plate XXII.—An oval black Muscat Grape. *Season :* mid-season ; does not keep long in good condition after becoming ripe. *Merits :* first-class in quality and appearance, but somewhat delicate.

SYN.—*Black Muscat of Alexandria, Red Muscat of Alexandria, Snow's Muscat Hamburgh, Venn's Seedling Black Muscat.*

VINE.—*Growth* moderately vigorous ; free-fruiting. *Leaves* large, deeply lobed and serrated ; dying off yellow.

FRUIT.—*Bunches* large, with long somewhat loose shoulders ; very frequently badly set, the bunch containing a number of half-developed berries. *Berries* large, above medium size, ovate. *Skin* thin, dark purplish, with a fine bloom. *Flesh* melting, very juicy, rich, sweet, and with a fine Muscat flavour, but not so pronounced as in the White Muscat of Alexandria.

HISTORY, ETC.—This is a very old Grape, having been grown for many years under the name of *Black Muscat of Alexandria* ; but was almost lost until introduced to notice by the late Mr. Snow, of Wrest Park, about thirty-five years ago, as *Snow's Muscat Hamburgh*. It is now generally cultivated. *Venn's Seedling*, which is a reputed seedling raised by Mr. Venn, near Bristol, about 1870, is said to be of better constitution, etc., but after having grown them both we have not been able to detect any difference.

CULTURAL NOTES. — Although of free growth, this Grape is found somewhat difficult of cultivation through its tendency to shank. Various means have been advocated and adopted to obviate this evil, such as growing it in a warm border, and grafting on various stocks, several nurserymen keeping plants of it worked on the Black Hamburgh, which for a time seemed to suit it well. A Vine of this variety grafted at Chiswick on a late coarse Spanish Grape, is so altered thereby, that very little trace of Muscat is apparent. To succeed thoroughly with this fine Grape, it should be grown in a warm Vinery.

MUSCAT DE JÉSUS.—Chasselas Musqué.

MUSCAT DE JUILLET.—July Frontignan.

MUSCAT DE LIERVAL (45).—A round black Muscat Grape. *Season :* first early. *Merits :* third-rate.

SYN.—*Lierval's Frontignan.*

VINE.—*Growth* free, but slender ; very fruitful. *Leaves* small, round, dying off reddish.

FRUIT.—*Bunches* small, short, compact, remarkably well set. *Berries* small, round. *Skin* rather thick, black, with a fine bloom. *Flesh* juicy, sweet, and with a very pleasant Muscat flavour.

HISTORY, ETC.—Received from M. Leroy, of Angers, and grown at Chiswick.

CULTURAL NOTES.—Succeeds well in good seasons on the open wall; suitable for orchard-house cultivation.

MUSCAT LUNEL.—Muscat of Alexandria.

Plate XXII.—MUSCAT HAMBURGH.
(Bunch ⅓; berries natural size.)

MUSCAT MUSCADINE.—Chasselas Musqué.

MUSCAT NOIR.—Black Frontignan.

MUSCAT NOIR D'ANGERS.—Angers Frontignan.

MUSCAT NOIR DE MADÈRE.—Madeira Frontignan.

MUSCAT NOIR DE MEURTHE.—Meurthe Frontignan.

MUSCAT NOIR ORDINAIRE.—Black Frontignan.

MUSCAT NOIR DES PYRÉNÉES.—Angers Frontignan.

MUSCAT NOIR TARDIF.—Angers Frontignan.

MUSCAT ORANGE DU PORTUGAL.—Chasselas Musqué.

MUSCAT OTTONEL.—Ottonel.

MUSCAT PRIMAVIS.—Chasselas Musqué.

MUSCAT DU PUY DE DÔME.—Auvergne Frontignan.

MUSCAT QUADRAT.—See White Frontignan

MUSCAT REGNIER.—Chasselas Musqué.

MUSCAT ROMAIN.—Muscat of Alexandria.

MUSCAT ROUGE.—Grizzly Frontignan.

MUSCAT ROUGE DE MADÈRE.—Madeira Frontignan.

MUSCAT DE SARBELLE.—Sarbelle Frontignan.

MUSCAT ST. LAURENT.—St. Laurent.

MUSCAT TROVÉREN.—Trovéren Frontignan.

MUSCATELLIER NOIR.—Black Hamburgh.

ŒILLADE NOIRE (4).—An oval, black Sweetwater Grape. *Season:* mid-season. *Merits:* second-rate.

SYN.—*Mihaud du Pradel, Malvoisie Noire, Œillade Noire Musquée, Œillade Noire Précoce.*

VINE.—*Growth* moderately robust; moderately fruitful. *Leaves* medium size, deeply cut, dying off reddish, when they have a pretty appearance.

FRUIT.—*Bunches* above medium size, on long stalks, very loose, and with long loose shoulders; sets freely. *Berries* above medium size, long ovate. *Skin* thick, jet black, with a fine bloom, bearing a great resemblance to the Muscat Hamburgh. *Flesh* melting, juicy, with a sweet and exceedingly pleasant flavour.

HISTORY, ETC.—Received from M. Leroy, of Angers, and grown in the collection of the Royal Horticultural Society at Chiswick, and from thence distributed.

CULTURAL NOTES.—It will succeed under the treatment given in an ordinary Vinery.

OLDAKER'S WEST'S ST. PETER'S.—West's St. Peter's.

OTTONEL (62).—A round, white Muscat Grape. *Season:* first early. *Merits:* third-rate, but valuable on account of its earliness and hardiness.

SYN.—*Muscat Ottonel.*

VINE.—*Growth* slender, but free; very fruitful. *Leaves* small, roundish, dying off pale yellow early.

FRUIT.—*Bunches* small, short, cylindrical; well set. *Berries* small, round. *Skin* thick, greenish yellow. *Flesh* peculiarly dry, yet tender and very sweet, with a strong Muscat flavour.

HISTORY, ETC.—Received from M. Leroy, of Angers, and fruited at Chiswick.

CULTURAL NOTES.—Excellent for pot-culture in orchard-houses, and ripens freely on the open wall in ordinary seasons.

PARSLEY-LEAVED.—Ciotat.

PATRAS CURRANT.—Black Corinth.

PENNINGTON HALL HAMBURGH.—Gros Guillaume.

PASSE MUSCAT.—Muscat of Hamburgh.

PLANTRICHE.—Aramon.

POCOCK'S DAMASCUS.—Black Prince.

POPE'S HAMBURGH.—Black Hamburgh.

PRIMAVIS MUSCAT.—Chasselas Musqué.

PROLIFIC SWEETWATER (28).—A round white Sweetwater Grape. *Season*: early. *Merits*: first-class. A great improvement on the old Sweetwater, sets more freely.

SYN.—*Gros Coulard.*

VINE.—*Growth* moderately robust, with fine, free constitution; fruitful. *Leaves* roundish, much toothed, dying off yellow.

FRUIT.—*Bunches* small, somewhat loose and irregular, thinly set. *Berries* medium-sized, round. *Skin* very clear and transparent, greenish white. *Flesh* very tender, juicy, rich, and pleasant.

HISTORY, ETC.—Our first acquaintance with this Grape was in the collection of Messrs. Rivers. It has also fruited at Chiswick.

CULTURAL NOTES.—Excellent for pot-culture, and succeeds well in a cool orchard-house.

QUEEN VICTORIA.—Royal Muscadine.

RAISIN DE CALABRE (88)—Plate XXIII.—A round white Vinous Grape. *Season*: late, will hang fresh until March. *Merits*: third-rate in quality, but keeps remarkably well.

SYN.—*Calabrian Raisin.*

VINE.—*Growth* very free and vigorous, with fine constitution, the young shoots being moderately strong, somewhat long-jointed, and with clean, pale bark; very fruitful. *Leaves* medium size, rather deeply toothed, dying off a very pale yellow and falling very early.

FRUIT.—*Bunches* from twelve to twenty inches long, somewhat loose, tapering, on long woody stalks, slightly shouldered. *Berries* medium size, quite round, freely set, but never crowded, on very strong foot-stalks, which, on pulling the berry off, retain a portion of the flesh. *Skin* whitish, almost transparent, showing the seeds through. *Flesh* thick and firm, with a sweet but by no means a rich flavour.

HISTORY, ETC.—Received by the Horticultural Society from Messrs. Baumann, of Bolwyller, and described by Thompson in the Journal of the Society in 1846. It is still grown in the great Grape Conservatory at Chiswick, but is not

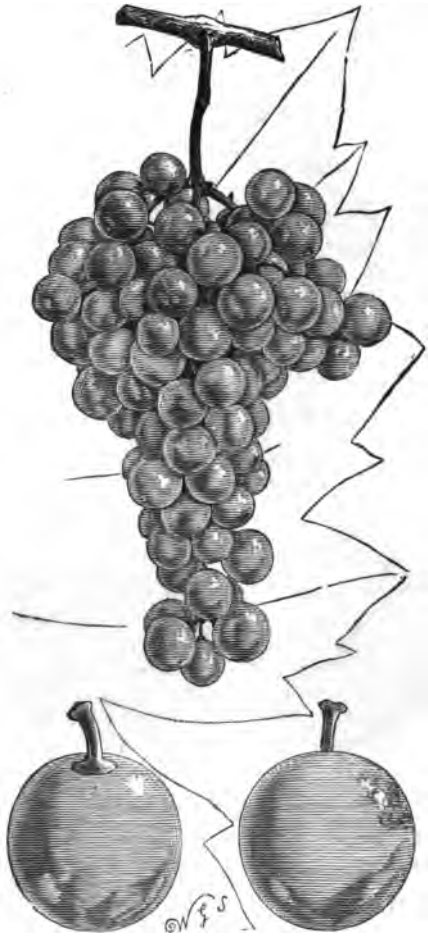

Plate XXIII.—RAISIN DE CALABRE.
(Bunch ½; berries natural size.)

generally to be met with in gardens. In some parts of the country, the name of Raisin de Calabre has got applied to the Trebbiano; and the large bunches grown by Mr. Curror, of Eskbank, under that name were, in reality, Trebbiano, the berries of which are slightly ovate.

CULTURAL NOTES.—Will succeed in any ordinary Vinery, and requires no special care. Best suited for late house, the berries keeping remarkably plump and fresh until late in spring.

RAISIN FRAMBOISIER.—Strawberry.

RAISIN DE CORANCE.—Black Corinth.

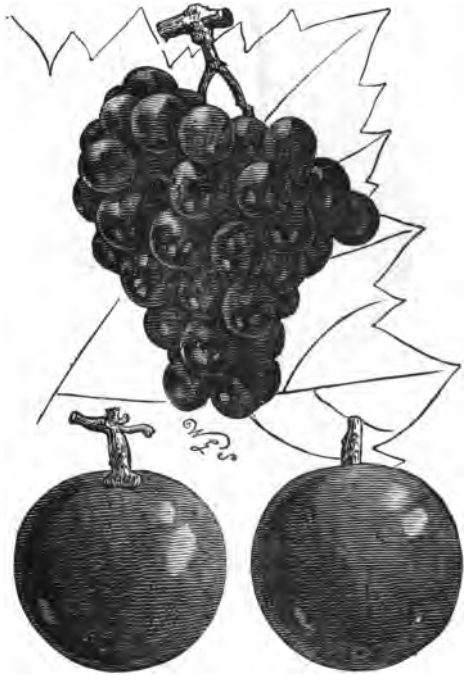

Plate XXIV.—ROYAL ASCOT.
(Bunch ½; berries natural size.)

RAISIN DE JÉRICHO.—Syrian.

RAISIN DE LA MADELEINE.—Black July.

RAISIN DE LA PALESTINE.—Syrian.

RAISIN DE LA TERRE PROMISE.—Syrian.

RED CHASSELAS.—Chasselas Rose.

RED FRONTIGNAN.—Grizzly Frontignan.

RED HAMBURGH.—Black Hamburgh.

RED MUSCAT OF ALEXANDRIA.—Muscat Hamburgh.

RED RHENISH.—Lombardy.

ROYAL ASCOT (74)—Plate XXIV.—An oval black Vinous Grape. *Season*: mid-season. *Merits*: second-rate in quality; handsome in berry, but too small in the bunch.

VINE.—*Growth* robust and vigorous, with a fine free constitution; very fruitful, frequently producing three or four bunches on one shoot, and also, occasionally producing other bunches on the young laterals, which peculiarity induced the raiser to designate it a "perpetual" bearer. *Leaves* large, roundish, deeply toothed, dying off reddish.

FRUIT.—*Bunches* small, rarely exceeding half-a-pound in weight, short, broad, frequently forked, or with one large shoulder; very closely set, requiring early thinning. *Berries* large, roundish-ovate, with stout stalks. *Skin* very thick, purplish black, with a heavy bloom; commences to colour very early, and becomes black a long time before being ripe. *Flesh* very firm, with a strong, piquant, plum-like flavour, becoming rich when thoroughly ripe.

HISTORY, ETC.—This was raised by the late Mr. John Standish, of Ascot, from a cross between Bowood Muscat and Muscat Trovéren, and received a First Class Certificate from the Royal Horticultural Society.

CULTURAL NOTES.—Succeeds well and fruits freely in any ordinary Vinery, but requires a long time to ripen thoroughly. Is extremely well suited for pot-culture.

ROYAL MUSCADINE (29)—Plate XXV.—A round white Sweetwater Grape. *Season*: early. *Merits*: first-class as to quality, and also as an early free-fruiting out-door Grape; it will also keep in good condition long after becoming ripe.

SYN.—*Amber Muscadine, Common Muscadine, White Chasselas, Chasselas de Fontainebleau, Chasselas Hâtif de Teneriffe, Golden Bordeaux, Queen Victoria, White Muscadine, White Sweetwater, etc.*

VINE.—*Growth* very free and vigorous, with a fine constitution, the young shoots slender, but ripening freely, the bark dark reddish brown; extremely fruitful. *Leaves* small, roundish, slightly lobed, dying off early of a pale yellow colour.

FRUIT.—*Bunches* medium-sized or small, long, tapering, broadly shouldered, and somewhat loose; freely set. *Berries* small, round, pale greenish yellow, becoming transparent when fully ripe, or if exposed to bright sun, the one side becoming of a bright cinnamon-russet, in which condition they are very much richer and sweeter. *Flesh* firm, yet tender, juicy, sweet, and extremely agreeable to the palate. When kept until they begin to shrivel, they are extremely rich.

HISTORY, ETC.—This is a well-known Grape, which has been long grown in this country, frequently as the *White Sweetwater;* indeed, being the better Grape of the two, it is fast superseding that variety. It is the same as the *Chasselas de Fontainebleau* of the French, or the *White Chasselas*, so common in the Paris restaurants. Figured in the *Pomological Magazine, I.*, p. 18, under the name of *Common Muscadine*, but Langley and others say that these are distinct varieties.

CULTURAL NOTES.—The best Grape for cultivation in the open air against walls in this country. In the southern counties, in favourable seasons, it ripens

freely and well. Good for pot-culture, and for growing in an ordinary Vinery, where it ripens a fortnight before the Black Hamburgh,

ROYAL VINEYARD (82).—An oval white Vinous Grape. *Season*: late; hangs and keeps remarkably well. *Merits*: third-class.

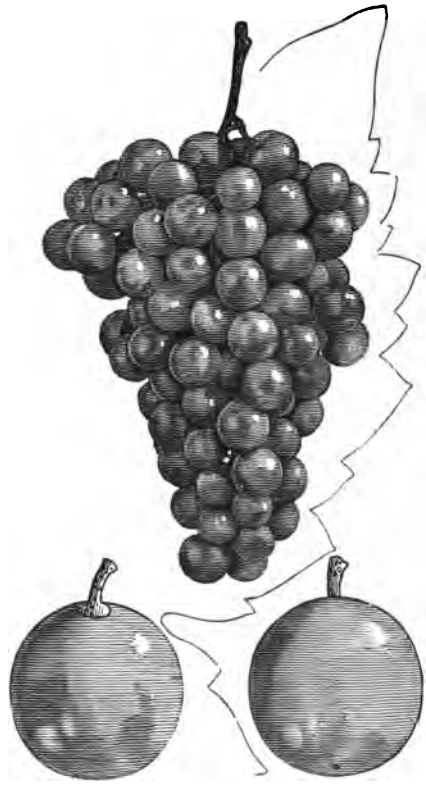

Plate XXV.—ROYAL MUSCADINE.
(Bunch ½; berries natural size.)

VINE.—*Growth* very strong and robust; moderately fruitful. *Leaves* large, dying off yellow.

FRUIT.—*Bunches* large, long, tapering, but irregular, loosely shouldered; generally sets badly. *Berries* medium, roundish ovate. *Skin* thin, membraneous, clear and transparent, adhering somewhat to the flesh. *Flesh* firm, dull greenish, moderately juicy, with an agreeable, sweetish flavour; and, when highly ripened, partaking slightly of the Muscat.

HISTORY, ETC.—Introduced by Messrs. Parker and Williams, about 1860, and received a First Class Certificate from the Royal Horticultural Society. Not much cultivated.

CULTURAL NOTES. — This Grape requires to be grown in a warm Muscat house ; a little extra care is necessary for the setting of the berries.

ST. LAURENT (55).—An oval white Muscat Grape. *Season*: first early. *Merits*: first-rate in quality; one of the best of the small Muscat Grapes.

SYN.—*Muscat St. Laurent.*

VINE.—*Growth* moderately strong ; very fruitful. *Leaves* small, roundish, slightly serrated.

FRUIT.—*Bunches* small, very compact, very closely and freely set. *Berries* small, roundish oval. *Skin* very thin, of a pale amber-yellow colour. *Flesh* tender, very juicy, sweet, and pleasant, with a strong Muscat flavour.

HISTORY, ETC.—Received from Messrs. Rivers, and fruited at Chiswick.

CULTURAL NOTES. — Well adapted for culture in pots, being extremely fruitful ; it ripens in good seasons on the open wall.

ST. PETER'S.—Alicante.

SARBELLE FRONTIGNAN (47). — A round black Muscat Grape. *Season* : early. *Merits* : of excellent quality, but too small in bunch and berry.

SYN.—*Muscat de Sarbelle.*

VINE.—*Growth* moderately strong with a free constitution ; free-fruiting. *Leaves* small, roundish, deeply toothed.

FRUIT. — *Bunches* small, and rather loose ; setting indifferently. *Berries* small, round, uneven in size. *Skin* dark purple, thick. *Flesh* dark, firm, sweet, and pleasant, with a slight Muscat flavour.

HISTORY, ETC.—Received from the collection of Messrs. Rivers. Not much cultivated.

CULTURAL NOTES.—An excellent small Grape for cultivation in pots, and will ripen against the open wall in favourable seasons.

SEACLIFFE BLACK.—Gros Guillaume.

SNOW'S MUSCAT HAMBURGH.—Muscat Hamburgh.

SYRIAN (83). — An oval white Vinous Grape. *Season* : late. *Merits*: third-rate.

SYN.—*Raisin de Jéricho, Raisin de la Palestine, Raisin de la Terre Promise.*

VINE.—*Growth* very strong and robust ; moderately fruitful. *Leaves* large, downy, deeply lobed and toothed, dying off yellow.

FRUIT.—*Bunches* very large, loose, from eighteen to twenty-four inches or more in length, and having very broad loose shoulders ; setting freely. *Berries* large or above medium size, ovate. *Skin* rather thick, greenish white. *Flesh* firm, moderately juicy, sweet and pleasant when well ripened, but having no particular flavour.

HISTORY, ETC.—A very old Grape, supposed to be that alluded to in the old Testament *(Book of Numbers)*. It is to be found in many old gardens, but very seldom planted now. Speechly, of Welbeck, is reported to have grown a bunch of this variety which weighed over nineteen pounds, which was the largest bunch on record until 1875, when it suffered a double eclipse in Scotland, as noticed in our account of the Trebbiano Grape.

CULTURAL NOTES.—Will succeed under similar treatment to Black Hamburgh, but being a strong grower requires ample space, and fruits better in a rather shallow border. The better ripened the berries are, the richer and sweeter their flavour.

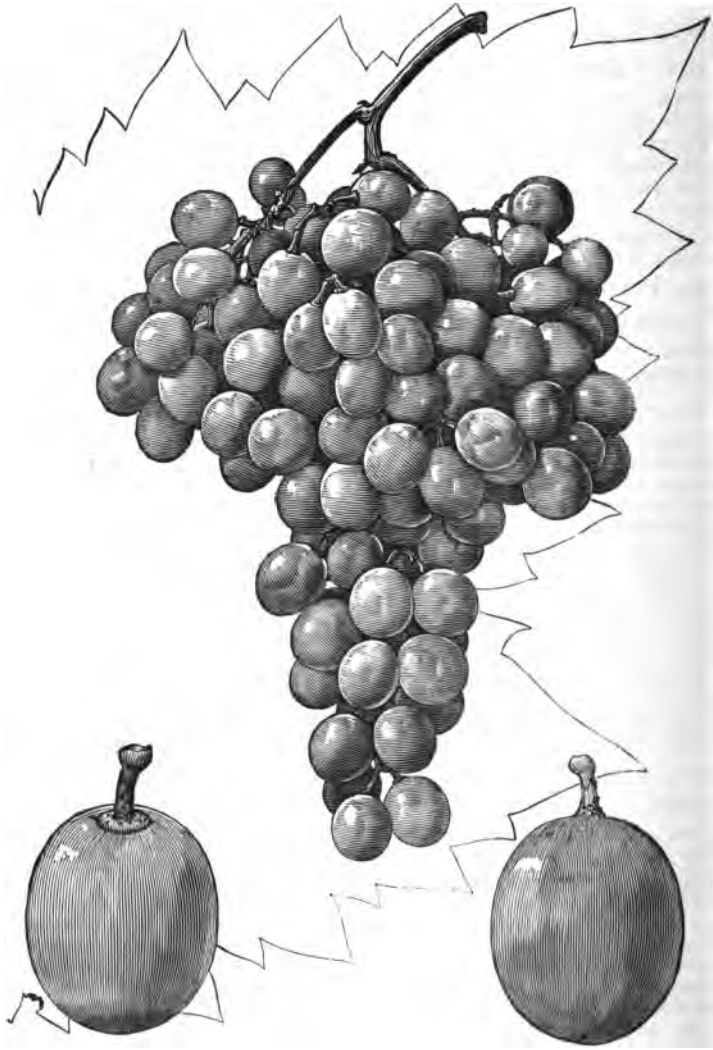

Plate XXVI.—TREBBIANO.
(Bunch ½; berries natural size.)

TERRE DE LA PROMISE.—Syrian.

TOTTENHAM PARK MUSCAT.—Muscat of Alexandria.

TREBBIANO (84).—Plate XXVI.—An oval white Vinous Grape. *Season*: late. *Merits:* second-rate in quality, but valuable for its handsome appearance and late-keeping properties.

VINE.—*Growth* remarkably strong and robust, the young shoots being very thick, almost gross, but ripening freely; they are generally coated with down around the buds, which are large and prominent; moderately fruitful. *Leaves* large, soft and much covered on the under surface with thick down; deeply toothed, dying off pale yellow.

FRUIT.—*Bunches* of the very largest size, with broad, strong shoulders, and thick stalks, compact, and always well set. *Berries* medium-sized, roundish-ovate, on stout foot-stalks. *Skin* greenish yellow, changing to pale amber when well ripened, tough and thick. *Flesh* firm, yet juicy, sweet, and pleasant, but lacking richness, excepting when very highly ripened.

HISTORY, ETC.—The origin or introduction of this well-known Grape is unknown to us. It is largely grown for late work. Some of the finest examples we remember to have seen were grown by the late Mr. Drewett, when gardener to Mrs. Hope, at The Denbies, Dorking, Surrey; hence it was by some termed the Denbies Trebbiano. Mr. Curror, of Eskbank, exhibited at Edinburgh in 1875 a bunch of this Grape weighing twenty-six pounds four ounces, which is the largest bunch of Grapes on record.

CULTURAL NOTES.—Being of strong growth, this Grape requires considerable space to develope properly; and, although it fruits freely along with Black Hamburgh, it well repays treatment similar to Muscats. Mr. Gilbert, of Burghley, who is one of the best cultivators of the Trebbiano we know, gives plenty of time and plenty of heat to ripen it thoroughly, when the berries keep sound until March and April, and are then very rich.

TRENTHAM BLACK (5).—An oval, black Sweetwater Grape. *Season*: mid-season, or for immediate use after ripening. *Merits*: in quality first-class, but so uncertain as to be scarcely worth growing.

SYN.—*Fleming's Prince, Long Noir d'Espagne.*

FRUIT.—*Growth* strong and free, the shoots rather long-jointed; moderately fruitful. *Leaves* large, deep green, with reddish stalks, rugose, very deeply lobed and toothed, dying off reddish.

FRUIT.—*Bunches* long, loose or straggling, broadly shouldered, nearly always badly set. *Berries* large, long ovate, on stout stalks. *Skin* thin, densely black, and covered with a thick, remarkably beautiful bloom. *Flesh* extremely delicate, juicy, rich and sweet. A Grape of excellent flavour.

HISTORY, ETC.—The late Mr. Fleming, of Trentham, was the first to direct attention to this Grape. He exhibited it, in the first instance, to the Horticultural Society as *Fleming's Prince*, which name was subsequently altered to Trentham Black. M. Leroy, of Angers, sent it to the Horticultural Society, Chiswick, as *Long Noir d'Espagne.*

CULTURAL NOTES.—Will succeed and ripen very well under the same conditions as the Black Hamburgh, but requires great care in setting. The berries are also somewhat liable to crack and decay.

TRIPOLI.—Black Hamburgh.

TROLLINGER.—Frankenthal.

TROVÉREN FRONTIGNAN (63).—A round, white Muscat Grape. *Season*: mid-season. *Merits*: first-class in quality, but scarcely worthy of cultivation.

SYN.—*Muscat Trovéren.*

VINE.—*Growth* moderately robust, the wood always ripening well; fruitful. *Leaves* large, roundish, deeply toothed, somewhat rugose.

FRUIT.—*Bunches* long, cylindrical, very compact, on rather long, strong stalks; well and closely set. *Berries* under medium size, round, on stout foot-stalks. *Skin* tough, the major portion of the berries of a clear greenish yellow colour, the others of a deep amber, sometimes tinged with red or dirty brown; the flavour of the latter being much richer and sweeter than the pale coloured, *Flesh* firm, crackling, yet juicy and rich, with a strong Muscat flavour.

HISTORY, ETC.—Our first acquaintance with this Grape was made in the nurseries of Mr. Standish, Ascot. It is of Continental origin, and is grown at Chiswick.

CULTURAL NOTES.—Requires a warm house to ripen the fruit thoroughly. The more heat that is applied the higher the flavour, and the more unsightly the colour. It will fruit fairly well in an ordinary Vinery.

TYNINGHAME MUSCAT.—Muscat of Alexandria.

VENN'S SEEDLING BLACK MUSCAT.—Muscat Hamburgh.

VICANE.—Bicane.

VICTORIA HAMBURGH.—Black Hamburgh.

WALTHAM CROSS (85).—An oval, white Vinous Grape. *Season*: late; one of the latest Grapes in cultivation. *Merits*: very large and handsome, but quite second-rate in quality.

VINE.—*Growth* remarkably strong and robust; moderately fruitful. *Leaves* large, deeply toothed.

FRUIT.—*Bunches* very large, long and regularly tapering, on strong stalks, evenly shouldered, freely set. *Berries* very large, long ovate, fully larger than those of the Muscat of Alexandria, which it greatly resembles when perfectly ripe. *Skin* thick, pale yellow. *Flesh* firm or hard, sweet, but by no means rich in flavour. Handsome in appearance, and keeps well after becoming ripe.

HISTORY, ETC.—A seedling raised by Mr. William Paul, of Waltham Cross, about the year 1870. Received a First Class Certificate from the Royal Horticultural Society.

CULTURAL NOTES.—Being a late Grape, it succeeds best in a house suitable for Muscats, where sufficient heat can be applied to ripen the fruit thoroughly. It is not much cultivated.

WANTAGE.—Lombardy.

WARNER'S HAMBURGH.—Black Hamburgh.

WEST'S ST. PETER'S (75)—Plate XXVII.—An oval, black Vinous Grape. *Season*: late. *Merits*: first-class as a late variety, second only in point of quality to Black Hamburgh; one of the most refreshing of Grapes for invalids.

SYN.—*Money's West's St. Peter's, Oldaker's West's St. Peter's, Abercairney, Major Moray's.*

VINE. — *Growth* very free, moderately robust, the young shoots firm, and always well ripened; very fruitful. *Leaves* of moderate size, rugose, deeply toothed, with reddish veins and leaf-stalks, sometimes dying off pale yellow, at other times highly coloured.

Plate XXVII.—WEST'S ST. PETER'S.

(Bunch ½; berries natural size.)

FRUIT.—*Bunches* medium-sized, rather loose, broadly shouldered, on strong but very thin wiry foot-stalks; very freely set. *Berries* medium-sized, roundish ovate. *Skin* thin, membraneous, very black, and covered with a fine bloom. *Flesh* tender, very juicy, sweet, and at all times remarkably fresh and pleasant.

HISTORY, ETC.—Some thirty years ago this fine old Grape was considered the best late variety in cultivation, and was extensively planted. At Chatsworth, Frogmore, etc., it is still a leading late Grape. A number of spurious varieties at

one time existed; hence, to distinguish the true one, it was by some called Oldaker's West's St. Peter's, from its having been extensively grown by Mr. Oldaker, gardener to Sir Joseph Banks, at Spring Grove, whilst others named it Money's West's St. Peter's.

CULTURAL NOTES.—A somewhat warmer treatment than that required for the Black Hamburgh is desirable; not so much to set the berries as to ripen the fruit. It succeeds best in a house by itself, and should be grown so as to have the fruit ripe in September; it will then keep well until March.

WHITE FRANKENTHAL (30).—A round white Sweetwater Grape. *Season*: mid-season; does not keep well. *Merits*: third-rate; greatly inferior in every respect to the Black Hamburgh or Frankenthal, of which this is a white prototype.

VINE.—*Growth* somewhat slender, but of good constitution, and ripening freely; moderately fruitful.

FRUIT.—*Bunches* below medium size, short, very broadly shouldered, setting freely. *Berries* medium-sized, roundish. *Skin* thin, clear greenish white, almost transparent. *Flesh* watery, sweet, but not rich.

HISTORY, ETC.—Received from M. André Leroy, of Angers, by the Royal Horticultural Society; and has been grown at Chiswick for some years.

CULTURAL NOTES.—Will succeed in any ordinary Vinery.

WHITE FRONTIGNAN (64).—A round white Muscat Grape. *Season*: early. *Merits*: first-class.

SYN.—*Muscat Blanc.*

VINE.—*Growth* free, of moderately robust constitution; very fruitful. *Leaves* deeply serrated.

FRUIT.—*Bunches* medium-sized, long, generally cylindrical; very closely and freely set. *Berries* small, or below medium size, round. *Skin* thin, dull greenish yellow, often much covered with dull russet. *Flesh* firm, yet juicy, very sweet, rich, and with a strong Muscat flavour.

HISTORY, ETC.—This is one of the fine old varieties of Grapes which are now seldom planted, and are becoming neglected, though formerly it was to be found in every collection. We have received a variety of this Grape from Hungary, named Muscat Quadrat, having the berries of an oblate shape, similar to a flat Tomato; a very interesting variety.

CULTURAL NOTES.—Will succeed well in any Vinery; when grown in a warm house the flavour of the fruit is richer, but it ripens very well in a cool house, or in fine seasons on the open wall.

WHITE LADY DOWNE'S SEEDLING (90).—A round, white Vinous Grape. *Season*: late; one of the very latest of white Grapes. *Merits*: quite third-rate.

VINE.—*Growth* moderately free; fruitful.

FRUIT.—*Bunches* medium-sized, loose and irregular in shape, some being cylindrical, others shouldered; setting indifferently. *Berries* medium-sized, round. *Skin* greenish yellow, often much covered with dirty russet, which detracts from its appearance. *Flesh* firm or hard, with a somewhat strong, harsh flavour.

HISTORY, ETC.—Raised by Mr. William Thomson, when gardener at Dalkeith, from a cross between Lady Downe's Seedling and Muscat of Alexandria. A very inferior variety was first sent out under this name, but this being withdrawn, the present variety was substituted.

CULTURAL NOTES.—Requires to be grown in a warm house, with considerable heat to ripen the berries, to have it in good condition. It is not much cultivated.

WHITE LISBON (86).—An oval, white Vinous Grape. *Season*: late, improves by keeping. *Merits*: third-rate.

SYN.—*White Portugal, White Raisin.*

VINE.—Remarkably strong and vigorous in constitution; very fruitful.

FRUIT.—*Bunches* large, long, somewhat loose; setting freely. *Berries* large, ovate. *Skin* thick, greenish white. *Flesh* firm, moderately juicy and sweet, but with no special character.

HISTORY, ETC.—This is the white Grape sold in grocers' shops during the winter. It has been very little grown in this country, but has fruited several times at Chiswick.

CULTURAL NOTES.—Requires treatment similar to the Black Hamburgh to ripen its fruit properly. Keeps well after ripening.

WHITE MUSCADINE.—Royal Muscadine.

WHITE NICE (91).—A round white Vinous Grape. *Season*: late; improves by keeping. *Merits*: second-rate.

VINE.—*Growth* remarkably vigorous, producing strong thick wood; moderately fruitful. *Leaves* very large, deeply toothed, very downy on the under side.

FRUIT.—*Bunches* very large, loose and straggling, with long, thin shoulders; setting freely. *Berries* medium-sized, round. *Skin* thin, membraneous, pale greenish white. *Flesh* moderately firm, juicy, sweet and pleasant to the taste when well ripened, but by no means rich.

HISTORY, ETC.—This is a very old Grape, the name appearing in all the old lists; it is, however, not now cultivated to any extent. There is some confusion between this White Nice and the Syrian, although they are quite distinct. The late Mr. Fowler, of Castle Kennedy, is reported to have exhibited a bunch weighing seventeen pounds two ounces; and Mr. Dickson, of Arkleton, other clusters weighing respectively eighteen pounds seven ounces, nineteen pounds five ounces, and twenty-five pounds fifteen ounces.

CULTURAL NOTES.—Requires treatment similar to that of the Black Hamburgh, but takes longer to ripen. Keeps well.

WHITE PORTUGAL.—White Lisbon.

WHITE RAISIN.—White Lisbon.

WHITE SWEETWATER.—Royal Muscadine.

WHITE TOKAY (87).—Plate XXVIII.—An oval white Vinous Grape. *Season*: late. *Merits*: a first-class late white Grape, very worthy of cultivation.

VINE.—*Growth* remarkably strong and vigorous, with a fine free constitution, the young shoots very strong and always ripening well; very free-fruiting. *Leaves* large, deeply toothed.

FRUIT.—*Bunches* above medium size, regularly formed, on strong foot-stalks, having strong shoulders, compact; always freely set. *Berries* large, ovate. *Skin* thick, greenish white, showing the venation, becoming pale amber when fully ripe. *Flesh* firm, yet tender and juicy, with a sweet, pleasant, or sometimes rich flavour.

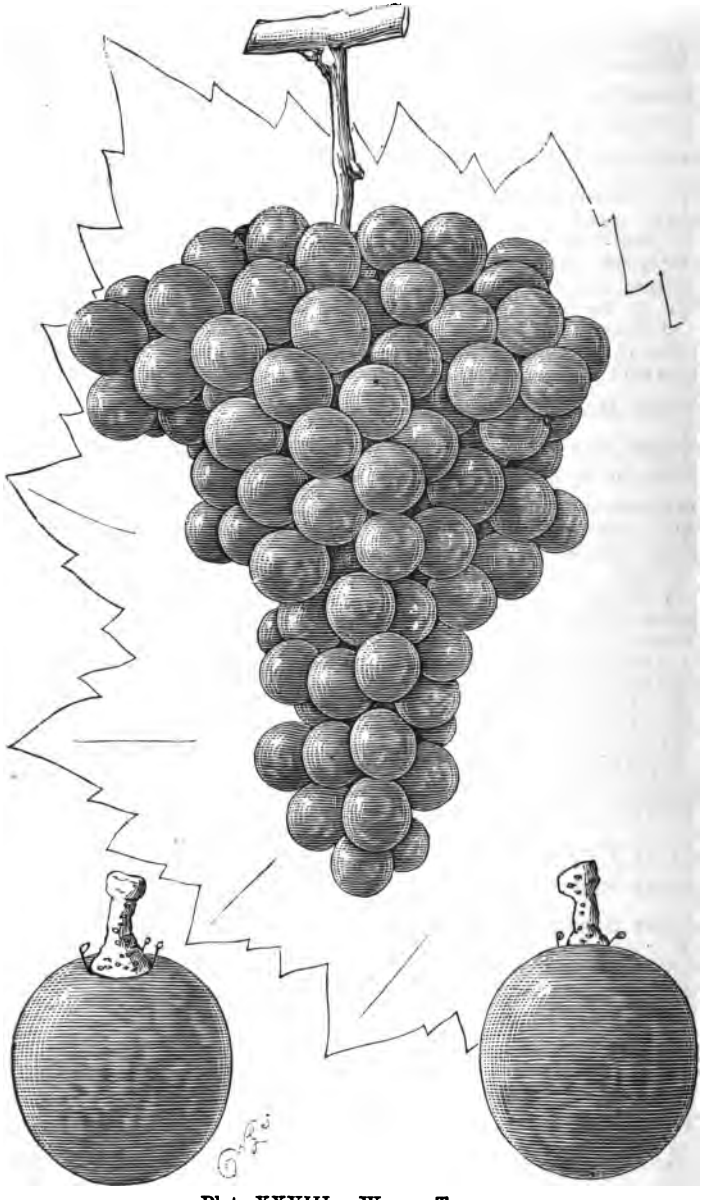

Plate XXVIII.—White Tokay.
(Bunch ½; berries natural size.)

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HISTORY, ETC.—An old Grape, at one time much more extensively grown than it is at present, and confused, to some extent, with the Muscat of Alexandria, which, in the north, used to be called Charlesworth Tokay.

CULTURAL NOTES.—Will succeed in any house suitable for the Black Hamburgh, but requires more time to ripen thoroughly.

WILMOT'S HAMBURGH.—Dutch Hamburgh.

ZANTE.—Black Corinth.

Fig. 56. LADY DOWNE'S SEEDLING GRAPE, AS GROWN AT CLOVENFORDS, THE SHOULDERS BEING TRIMMED OFF.

(Weight 4 lb.; ⅓ natural size.)

CHAPTER XXVIII.

THE VARIETIES OF AMERICAN GRAPES.

THESE form a class quite distinct from the European Grapes, or those ordinarily grown in this country, since they belong to a distinct species, *Vitis Labrusca*, which is a native of North America. They seem to be of two types, which are quite distinct: 1. The foliage deep green, thick or leathery, very downy or pubescent on the under surface. 2. The foliage large, very deeply lobed, smooth, pale. The fruit is also distinct, bunches being generally small, but very freely produced, and the berries small in comparison with the European Grapes. The flesh is generally of a greenish colour, and a somewhat mucilaginous texture, having a musky perfume, and a peculiar "foxy" sweetish flavour, which is at first somewhat objectionable, but the taste is gradually acquired, and afterwards relished.

The American Grapes are nearly all possessed of extraordinary vigour of constitution, and are remarkably free in growth. They have not been much subject to the ravages of mildew, or even the *Phylloxera*, on which account they have been largely used as stocks in French Vineyards on which to graft the European Grapes, so as to avoid these pests, and with some success. The Vines are very hardy, and ripen fruit freely in the open air in America, where the European Grapes cannot be cultivated with success. Their cultivation on the open walls in this country is well worthy of a trial. At Chiswick they ripen freely in a cold orchard-house.

The original or older varieties of American Grapes are admittedly of inferior quality, but during the last thirty years wonderful progress has been made in the raising of new hybrid varieties of large size and improved quality, which, in the warm climate of America, are, by good judges, considered equal to our Sweetwaters, and even Frontignans. Several of the American Grapes have a peculiar habit of what is termed "shedding" their fruit when becoming a little over-ripe, *i.e.*, the berries, although quite sound, become detached from the stalks in the same way as Peaches.

The following selection of varieties is made from those recommended to us by the late Mr. Hovey, and which are growing and have fruited in the Royal Horticultural Society's Gardens at Chiswick.

BRIGHTON (92).—Plate XXIX.—An early black Grape.

VINE.—*Growth* vigorous and very productive.

FRUIT.—*Bunches* small. *Berries* small, reddish black, thick bloom. *Flesh* tender, with a peculiarly sweet flavour.

HISTORY, ETC.—Obtained as a cross between Concord and Diana Hamburgh.

Plate XXIX.—BRIGHTON.
(Bunch ½; berries natural size.)

DUCHESS.—A white mid-season Grape.

VINE.—*Growth* vigorous and healthy, very productive and hardy. *Leaves* deeply lobed, not pubescent, and very distinct in character.

FRUIT.—*Bunches* long, loose. *Berries* of medium size, white. *Skin* thin. *Flesh* tender, brisk, sweet, and pleasant. Highly recommended.

ELDORADO (95).—A round yellow Grape.

VINE.—*Growth* moderately vigorous.

FRUIT.—*Bunch* small, badly set, stamens deflexed. *Berries* small, round, deep yellow, having a strong musky flavour; pleasant.

GOLDEN POCKLINGTON (96).—A round white Grape.

VINE.—*Growth* very vigorous and fruitful.

FRUIT.—*Bunches* of medium size, compact. *Berries* round, above medium size, of a clear golden yellow colour, very beautiful. *Skin* thin. *Flesh* clear, juicy, sweet, and slightly musky. This variety is very liable to "shedding" the fruit. Of several bunches received from America every berry had "shed."

HISTORY, ETC.—A seedling raised from the Concord, and figured in Mr. Vick's Catalogue.

JEFFERSON (99).—A round grizzly Grape.

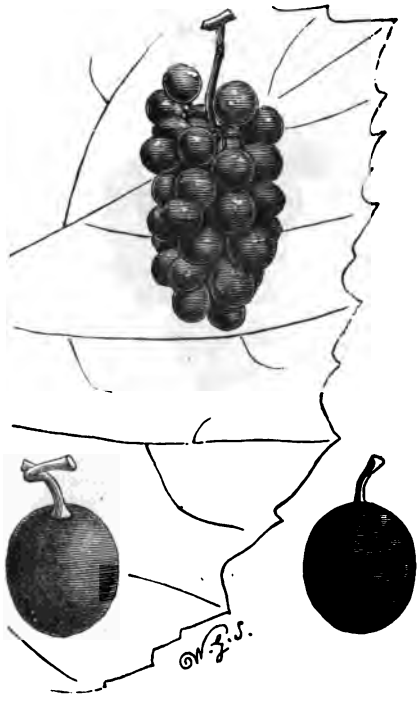

Plate XXX.—STRAWBERRY.

(Bunch ⅓; berries natural size.)

VINE.—*Growth* strong. *Leaves* large, smooth, deeply lobed.

FRUIT.—*Bunches* small, shouldered. *Berries* large, roundish, of a grizzly red colour. *Flesh* melting, of a brisk sweet flavour, very pleasant.

LADY (97).—A small, round yellow Grape.

VINE.—Moderately strong.

FRUIT.—*Bunches* small, thinly set, stamens deflexed. *Berries* small, round, deep yellow. *Flesh* melting, musky, rich.

LADY WASHINGTON (98).—A round yellow Grape.

VINE.—Strong. *Leaves* large, not much cut.

FRUIT.—*Bunches* long, loose. *Berries* medium size, round, yellow, sweet and pleasant.

MOORE'S EARLY (93).—A round, early black Grape.

VINE.—*Growth* very vigorous and free fruiting.

FRUIT.—*Bunches* small and compact. *Berries* small. *Skin* black, with a fine bloom. *Flesh* melting, but not of high quality.

STRAWBERRY (94)—Plate XXX.—A round, black, perfumed Grape. *Season*: mid-season. *Merits*: third-rate, but on account of its peculiar flavour and perfume, is extremely interesting.

SYN.—*Raisin Framboisier*.

VINE.—Moderately robust and free in *growth*, the young shoots ripening freely, the bark dark brownish red in colour; very distinct, very fruitful. *Leaves* deep green, medium-sized, roundish, and but slightly lobed, thick and very leathery, very downy on the under surface.

FRUIT.—*Bunches* very small, from three inches to four inches long, close and compact; freely set. *Berries* small, roundish, inclining to ovate. *Skin* thick, membraneous, dark purple covered with a fine bloom. *Flesh* dark, thick, or mucilaginous, parting freely from the skin, but requiring some effort to secure it in the mouth. *Flavour* a peculiar mixture of that of the Strawberry and Grape, sweet and pleasant, highly perfumed, so much so that a small plant with ripe fruit will fill the air in a house with a strong perfume, similar to that of ripe Raspberries.

HISTORY, ETC.—This Grape is generally assumed to be of American origin, on account of the great similarity of the leaves, and in the character of the fruit to the native American Grapes. Lady Cave sent us some fruit from near Montreaux, on the Lake of Geneva, and stated that she found it in the market at Gray, on the Saone, west of Dijon, in considerable quantities, so that it seems to have become pretty well established in that quarter. It is grown in this country more as a curiosity than for the value of the fruit. The late Duke of Devonshire, it was said, was very fond of it, and Mr. (Sir J.) Paxton had to grow the fruit especially for His Grace. During the past year or two, we have met with it in the gardens of Earl Brownlow, Ashridge Park; in those of the Earl of Rosebery, Mentmore; and at the Duke of Bedford's, Woburn. There is a red or grizzly variety of this, having the fruits equally perfumed.

CULTURAL NOTES.—Requires no particular care, will ripen its fruit well in any ordinary Vinery. It does well in a large pot, and this is the best way to cultivate it, as it is scarcely worth a permanent situation.

VIRGINIUS (100).—A round, red Grape.

VINE.—Strong. *Leaves* large, very deeply lobed.

FRUIT.—*Bunches* small and compact. *Berries* small, round, dark red, with a heavy bloom. *Flesh* melting, sweet and rich.

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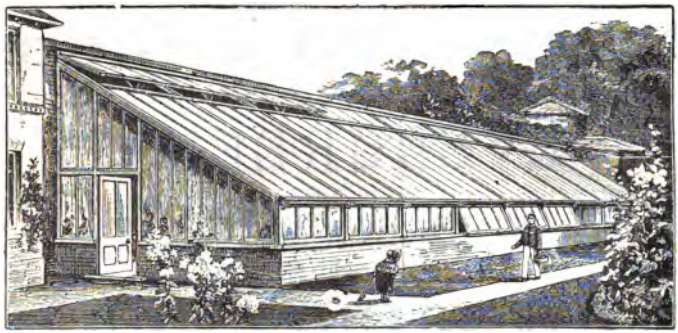

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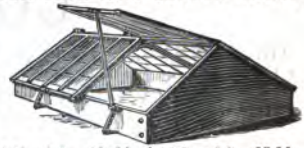

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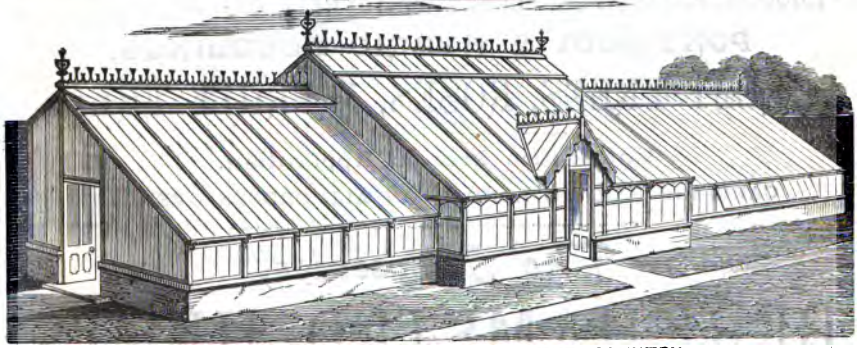

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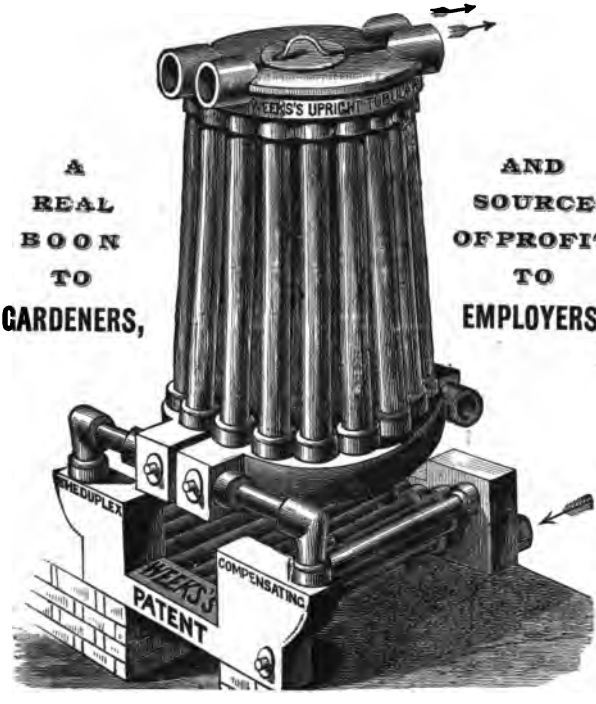

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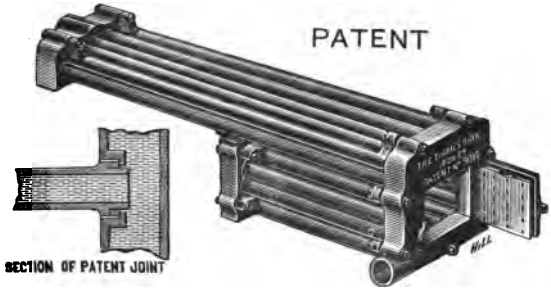

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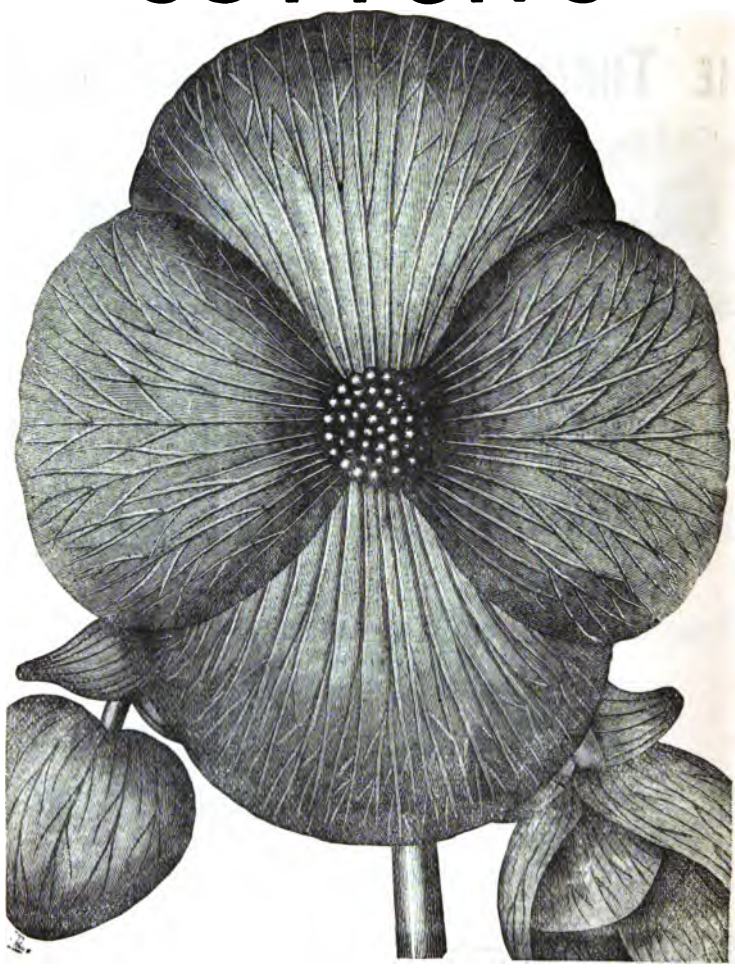

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